FEBRUARY 1953
20th Year

AMERICAN ARTISAN

RESIDENTIAL AIR CONDITIONING • WARM AIR HEATING • SHEET METAL CONTRACTING

BOTH FLOORS of Chicago's International Amphitheatre were crowded with more than 400 exhibits which made up the 11th International Heating and Ventilating Exposition, held January 26 to 30. The trends stressed in this bigger-than-ever show were dual-fuel equipment, perimeter heating, and packaged air conditioning for homes

CONTRACTORS should know facts about condensing units 40

WARM AIR ceiling panels heat homes effectively . . .46

WHEN CAN you recover the price on defective equipment? 58

"AIR conditioning sells homes," builders are told 67

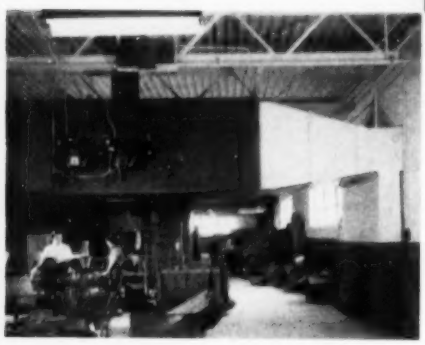
PROOF AGAIN — THAT J-C HEATING EQUIPMENT

LEADS THE WAY . . .

NEW PLANT USES FOUR J-C 1,000,000 BTU OUTPUT SUSPENSION FURNACES

See our catalog in Sweet's

View of the new, ultra-modern plant of Leigh Building Products, Division of Air Control Products, Inc. located outside of Coopersville, Michigan.



Note how installation of a J-C 1,000,000 BTU output suspension furnace saves valuable working space for the designers of the new Leigh Building Products plant.

. . . largest ever specifically designed for overhead installation

When officials of Air Control Products, Inc. planned a new plant for their Leigh Building Products Division, they were faced with a difficult heating and ventilating problem. But, they did as so many others are doing — they contacted Jackson & Church engineers. **The problem was to heat the plant's 43,500 square feet of manufacturing space and replenish nearly 50,000 c.f.m. of air.**

J-C engineers planned and supervised the installation of four 1,000,000 BTU output suspension furnaces. These J-C units are now operating successfully to replace the unusually large amount of exhausted air while still maintaining a comfortable and steady room temperature.

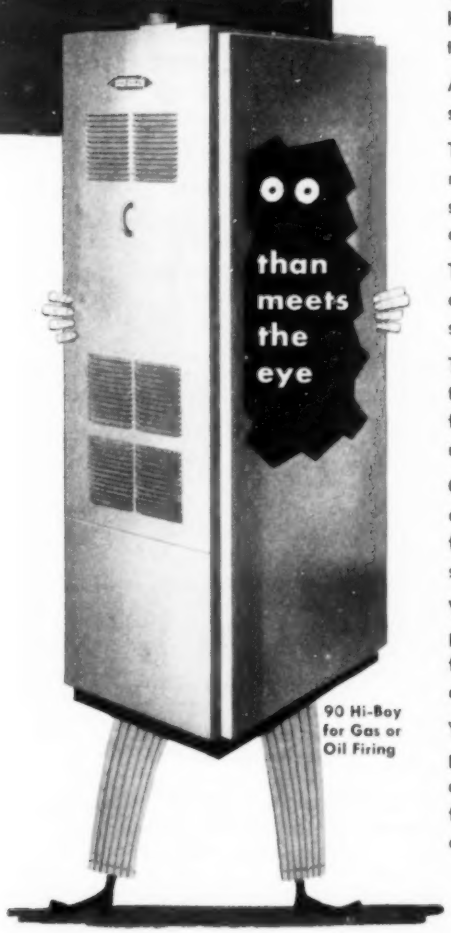
J-C

JACKSON & CHURCH CO. SAGINAW, MICHIGAN

Work well done since eighty-one

Lots more to it than meets the eye

KO-Z-AIRE



90 Hi-Boy for Gas or Oil Firing

ONE glance at the Hi-Boys pictured here tells you that KO-Z-AIRE's got what it takes in styling and good looks.

But the fellow who said a picture speaks louder than words wasn't talking about these skillfully engineered KO-Z-AIRE units. For it would take a book to describe in full all the many reasons why you profit more with the KO-Z-AIRE line.

As proof, there's KO-Z-AIRE's one-piece, gas-tight welded steel heat exchanger, that's designed for efficient heat transfer.

There's the feature of the integrally designed channel mounted base of KO-Z-AIRE units — which increases sturdiness — eliminates any need for special "grouting" and keeps cabinet dust-tight, leak-proof.

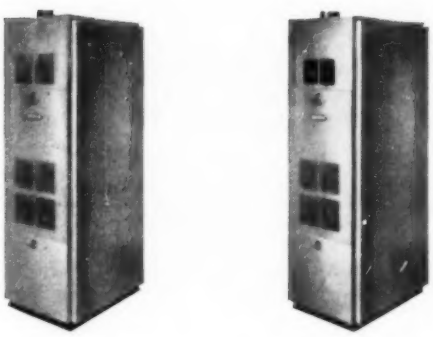
There's the fact that most KO-Z-AIRE furnaces are assembled and wired at the factory — to help speed installation, make it easier for you.

Then there's the all-important "Zero Clearance" approvals that these KO-Z-AIRE Hi-Boys have — which cuts costs for you since it means they can be installed in alcoves, utility rooms or closets.

Or there's the competitive edge you have with KO-Z-AIRE — as all Hi-Boys, and most other models, can be converted from one fuel to another at any time — so you can keep sales up despite restrictions.

We could go on and on. Dependable, quiet, economical performance. Automatic operation. Over 30 gas and oil-fired models, ranging from 70,000 to 420,000 BTU input — and all priced right for the job.

You can get a complete, unabridged description of this part of the big KO-Z-AIRE story by simply mailing the coupon below. But the happy ending — customer satisfaction, fewer-call-backs, bigger profits — is one thing we can't describe in words. You have to experience that yourself.



90 Hi-Boy

70 Hi-Boy

for gas or oil

KO-Z-AIRE PRODUCTS, INC.

RED OAK, IOWA

Representatives in Principal Cities

KO-Z-AIRE PRODUCTS, Inc. **Dept. AA2**
Red Oak, Iowa
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FIRM _____

CITY _____ STATE _____

mail coupon today

AMERICAN ARTISAN

FEBRUARY 1953

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Founded 1864

Volume 90 No. 2

RESIDENTIAL AIR CONDITIONING

WARM AIR HEATING

SHEET METAL CONTRACTING

Merged with American Artisan are "Warm Air Heating" and "Furnaces and Sheet Metals"

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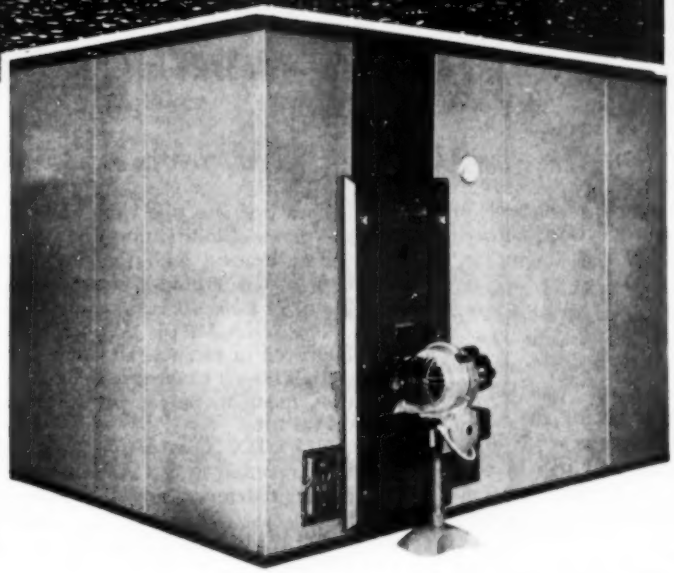

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330,000 to 1,000,000 B.T.U. – FOR

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Manufacturers of fine heating equipment for nearly a quarter century.

1–5–3

the editor's notebook

SMCNA Bulletin Treats Labor Relations

A RECENT BULLETIN (No. 63) of the Sheet Metal Contractors' National Association, Inc., offers information on the status of the 1952 *Conditions of Agreement Report* issued each year to show what has been agreed upon all around the country in *Standard Forms of Union Agreement and Addenda.* The report, according to the bulletin, has now been completed and mailed out.

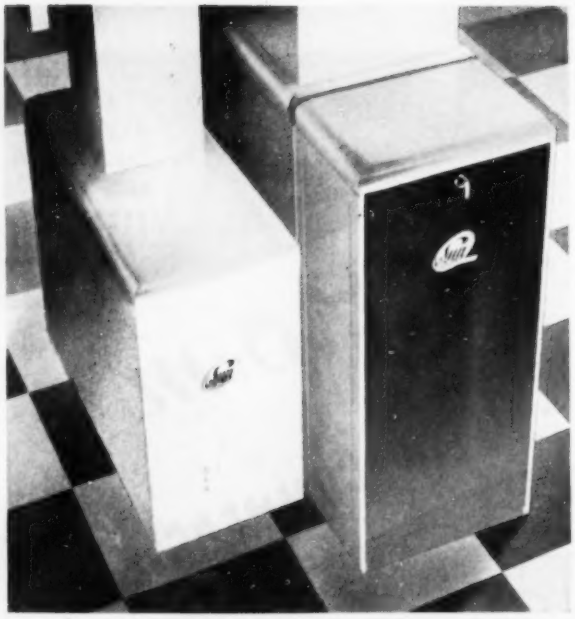
Also in preparation is a special bulletin on *Travel Pay,* presenting the outcome of months of consultation on this problem. The bulletin will offer several solutions and much information.

An interesting offshoot of the cooperative work between the Sheet Metal Contractors' National Association and the International Union has been the realization that the *Standard Form of Union Agreement,* as now printed, contains no terminal point for the settlement of disputes which deadlock in the final step in arbitration now in use. A terminal point is needed, it has been felt.

The association's labor relations committee, in studying this situation, has found that other industries have in their procedure for final settlement of disputes a grievance council, which meets regularly throughout the year. Under this procedure, both parties, when unable to settle their disputes, voluntarily place the settlement in the hands of the council. From the examinations of this procedure made to date, it appears to the association that this plan has much merit; so the joint labor relations committee is now studying a tentative plan to be presented to the industry.

While this study is underway, members and negotiating committees who deadlock have been invited to submit their dispute to SMCNA's labor relations committee as examples of disputes which might, under a proper plan, be settled by a grievance council for this industry — should such a council materialize.

Bulletin No. 63 also contains information on various government regulations now affecting the sheet metal industry. These bulletins are issued on a monthly basis by the association.



DOUBLE YOUR PROFITS

WINTER *Heating*

Sell plus

SUMMER *Cooling*

Now for the first time SUN dealers can sell home conditioning the year 'round—winter heating with the SUN Series 5000 Gas or Oil Furnace; summer cooling with the SUN Compressor Cooling Unit.

***The Series 5000* is brand new and greatly improved in every detail—new beauty of design, greater efficiency, one-piece construction, quiet operation, easier installation, oil or gas fired.**

***The SUN Compressor Cooling Unit*—a fit companion to the SUN furnace—delivers just-right temperature to every room in the house.**

Sell them *both* and *double* your profits in 1953.

Get complete details today.

Sun FUEL MASTER

product of

J. V. Patten Company

SYCAMORE, ILLINOIS, U.S.A.

ESTAB. 1898 • INC. 1924

Sees Big Year in Air Conditioning

ACCORDING to W. Paul Jones, president, Servel, Inc., the refrigeration industry can look forward to a record year in 1953, if it will take advantage of the opportunities offered it. For example, he said, there should be a virtually unlimited market in all-year air conditioning provided the product is simplified as to both manufacture and installation. The resulting reduction in cost would bring it within the reach of builders of moderately priced homes.

Aluminum Industry Sets New Record

THE ALUMINUM industry has set a new production record in 1952, in spite of curtailments due to power shortages, according to Donald M. White, secretary, The Aluminum Association. On the basis of definite figures for the first eleven months, total production of primary aluminum in the United States during the year is estimated at 1,860,000,000 pounds. This exceeds the 1,840,358,500 pounds produced in 1943, peak year of World War II.

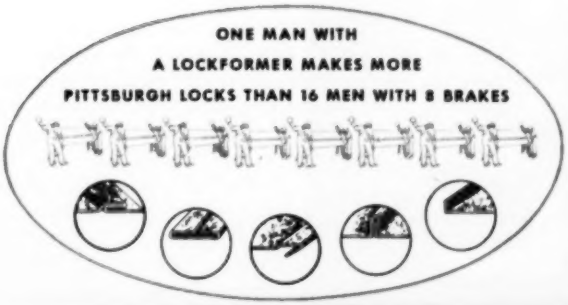
The worst drought in many

Why do it the hard way?

Get a Lockformer, and get rich!

All joking aside, a Lockformer cuts lock or seam making costs as much as 90%—cuts overall fabrication costs *in half*. Far from being a "big shop" machine, a Lockformer is an absolute "must" for ANY shop competing for heating or ventilating business.

Lockformers cost so little and earn so much that getting along without one is really doing things the hard way!



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the editor's notebook

(continued)

years sharply curtailed the production of electric power at hydroelectric plants serving primary aluminum smelters in both the Pacific Northwest and the South during the last quarter. The new capacity which went into operation as part of the industry's current expansion program, however, kept the production to high enough levels during the last three months of the year so that it was almost equal to the third-quarter total.

The industry's expansion program was hampered somewhat by the prolonged steel strike during the early part of the year. Nevertheless, four new smelting plants went into operation during the year and additional equipment expanded the capacity of four existing plants.

A third round of aluminum expansion was announced by the National Production Authority which is scheduled to increase the industry's annual primary capacity by 400,000,000 pounds.

During the fourth quarter of the year the Defense Production Administration announced an expansion goal for aluminum sheet and aluminum sheet and plate heat-treating facilities. The aim is to provide for additional rolling capacity for 684,000,000 pounds of aluminum sheet annually by January 1955 and additional heat-treating capacity for 846,000,000 pounds of sheet and plate annually by the same date.

Use of aluminum in buildings continued on a large scale during 1952 and will undoubtedly expand further when restrictions are removed; roofing material, wall panels, windows, and building fronts are the most important applications, the report states.

More Copper Allocated

GREATER allocations of refined foreign copper than originally

HERE THEY ARE...SENTRY'S TWO NEWEST ADDITIONS TO THEIR EVER-POPULAR

AT-A-GLANCE
(DIRECT AND REMOTE)
TANK GAUGES

THERMA-GAUGE

A superior quality, precision instrument with full view, solid red thermometer-type indicator

Without question, here is the easiest to read, *accurate measure* gauge on the market—And, the easiest to install, whether tank is empty, full or partially full. Unit features zinc base metal, two-piece die-cast assembly — Unbreakable red plastic assembly nut — Calibration chart, sealed between heavy, heat-resistant plastic domes—Brass rivets—And, a *double coated* cork float that's impervious to oil, many chemicals and acids. No gears, magnets, cams or tapes. Guaranteed to withstand in excess of 70 lbs. pressure per sq. inch. Tailor-made to fit individual tanks up to 12 ft. deep. Calibrated and factory adjusted.

QUICKLY, SIMPLY INSTALLED. Illus. at left shows how entire calibration and float assembly may be inserted and positioned *after* two piece die-cast tank plug has easily been installed in tank — only an ordinary wrench is needed.

SENTR-ECON

Write for complete details — literature

A new, durable, low cost instrument for economy installations.

Exceptionally high quality for such a competitively priced gauge. Features patented *double dome* with calibrations positioned between inner tube and outer heat-resistant plastic shell. Also, die-cast tank fitting — plated metals — brass rivets. No gears, magnets, cams or intricate mechanisms. *Double coated* cork float is impervious to oils, most chemicals and acids. Simple to install, even in partially-filled tanks. 1½" openings only. Factory calibrated and adjusted to insure accuracy.

KRUEGER *Sentry* GAUGES
GREEN BAY · WISCONSIN

the editor's notebook

(continued)

were contemplated were authorized for purchase by brass and copper wire mills during the 3rd and 4th quarters of 1952, National Production Authority has announced.

Net allocations for the brass mills were 55 per cent domestic, 45 per cent foreign for the 3rd quarter; and 57 per cent domestic and 43 per cent foreign for the 4th quarter.

For copper wire mills the net allocations were 56 per cent domestic and 44 per cent foreign for the 3rd quarter; 57 per cent domestic, 43 per cent foreign for the 4th.

Initial allocations were made on the basis of 60 per cent domestic and 40 per cent foreign, officials said. The decline in domestic production, as well as the willingness of the mills to pay the higher price for available foreign copper, accounted for the change in percentages, NPA pointed out.

Housing Starts During November

EIGHTY-SIX thousand new dwelling units were started during November, bringing total housing starts for the first 11 months of 1952 to 1,052,500, according to preliminary estimates of the U. S. Labor Department's Bureau of Labor Statistics. The November estimate represented a drop of 15 per cent from October, but was 15 per cent above that for November 1951. Although the downturn during November 1952 was widespread throughout the nation, it was no more than might be expected for this time of year, and was influenced partly by sharply decreased volume in the large cities which had reported unusually high activity during October, according to the bureau.

Private housing accounted for the entire decline during November, dropping 17 per

DEAL IN COMFORT...

That's what He *really* wants!

IT'S TRUE...

Putting all the facts together about the complete Waterbury line of furnaces and air conditioners, the end result . . . comfort . . . is what *really* satisfies your customers.

There are other reasons, of course, that satisfy customers and dealers alike. Quality design, construction and performance of Waterbury units are also real *sales* qualities. And the comprehensive dealer-distributor-factory policy of the Waterman-Waterbury Co. is ample assurance of a profitable future for every Waterbury dealer.

Waterbury
Year 'round
AIR CONDITIONER

FOR YEAR 'ROUND COMFORT...

The Waterbury YEAR 'ROUND AIR CONDITIONER is a compact dual unit. The summer assembly . . . built in two, three and five ton capacities . . . is easily added to Waterbury winter air conditioners already installed.

The Waterman-Waterbury Co.

OVER 46 YEARS OF WARM AIR HEATING

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the editor's notebook

(continued)

cent from 100,000 units in October to 82,800 in November. However, private housebuilding was 15 per cent above November a year ago, and for the first 11 months of 1952 totaled 1,000,100 new units. Public housing starts more than tripled from October to 3,200 units during November, but when volume for the first 11 months is considered, public housing during 1952 was 25 per cent under the 1951 level.

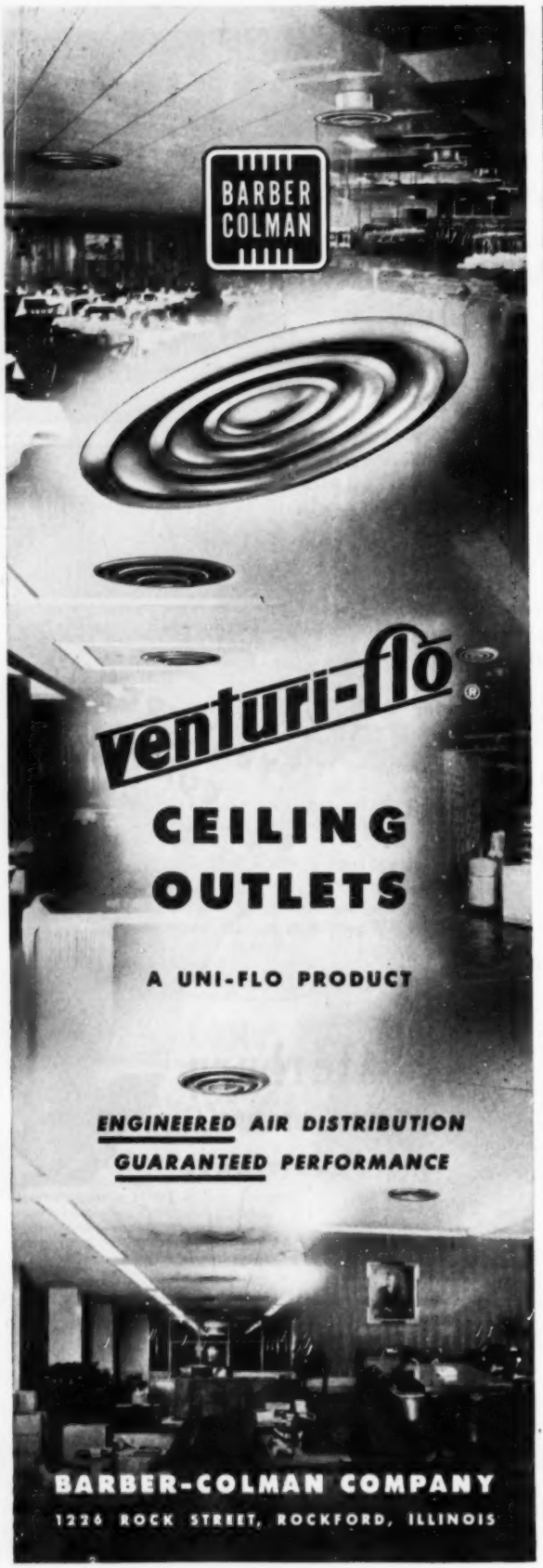
Because of the somewhat higher level of private starts this year, total house building volume for the first 11 months of 1952 was 22,000 units above the 1,030,500-unit total begun during the corresponding 1951 period.

On a seasonally adjusted basis, preliminary estimates indicate that total housing starts (private and public) were at an annual rate of 1,160,000 during November, slightly above the 1,156,000-unit rate in October. For September, the preliminary rate was 1,091,000, and for August the final revised rate was 1,037,000.

1952 Record Year for Petroleum Industry

DURING 1952, according to Petroleum Administration for Defense figures, the petroleum industry drilled 46,000 wells. At the beginning of the year PAD's forecast was for the drilling of 50,000 wells during the year. Drilling, however, was more seriously affected by the steel strikes than any other activity of the industry. While the 46,000-well figure is below the hoped-for level, it is still substantially above the 44,516-well figure for 1951 and will stand as a new drilling record.

It is estimated there are now approximately 170,000 miles of crude-oil and products pipelines in the country, of which



the editor's notebook

(continued)

about 7,000 miles — a record mileage — were laid during 1952.

Forecast of Demand for Crude Oil

THE AMOUNT of domestic crude petroleum consumed or exported in January 1953 is estimated by the Bureau of Mines, U.S. Department of the Interior at 6,446,000 barrels daily compared with 6,430,000 forecast for December 1952.

Data for October show total crude runs averaging 6,883,000 barrels daily, including runs of foreign crude of 608,000 barrels daily. Production of crude oil averaged 6,518,000 barrels daily, with an increase of 129,000 barrels daily in stocks of domestic crude and an indicated demand of 6,389,000 barrels daily. Current data for November indicate total crude runs of 7,030,000 barrels daily. Available data indicate that stocks of refined products were 20 million barrels higher on December 31, 1952 than a year ago.

The total demand for all oils in 1952, compared with 1951, was 4.7 per cent higher in the first quarter, 1.9 per cent larger in the second quarter, showed a gain of 1.9 per cent in the third quarter and an estimated increase of 4.7 per cent in the fourth quarter of 1952. The forecast for the first quarter of 1953 indicates a gain of about 5.2 per cent over the first quarter of 1952.

Steel Capacity Increased During 1952

THE STEEL CAPACITY of the United States went up 8,959,800 tons during 1952—the largest gain ever made in a year—raising the total annual capacity of this country to 117,547,470 net tons, the highest level ever achieved, according to American Iron and Steel Institute.

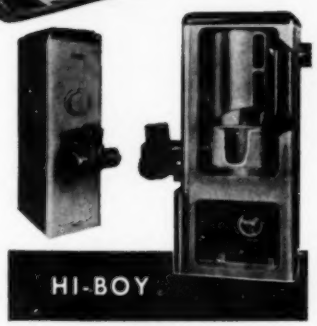
BEAT ALL COMPETITION

WITH

DELTA *Furnaces*

INTERCHANGEABLE OIL to GAS — GAS to OIL

AUTOMATIC HEATING



HI-BOY

3 SIZES

Versatile! Only 5' top to bottom —hides itself away in basement, utility room, or even a closet. One stock model with return at both sides and bottom. Three sizes—78,000, 90,000 and 110,000 BTU/HR at bonnet. Factory assembled — ready for installation.

LOW-BOY

3 SIZES

Popular style. Only 45" tall — 20" wide! Featuring DELTA gun-type flanged oil burner, built-in refractory combustion chamber, heavy gauge heat exchanger and large sirocco blower. Three sizes - 81,000, 93,000 and 113,000 BTU/HR. Factory assembled — ready for installation.

COUNTER FLOW

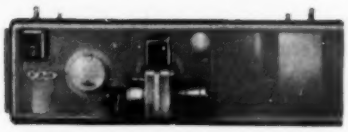
3 SIZES

Gaining popularity in slab constructed houses and crawl-space bungalows. Only 5' tall - 20" wide - 28" in depth - will even fit in a closet! Front or rear flue outlet optional. Three sizes - 78,000, 90,000 and 110,000 BTU/HR. Factory assembled.

AMERICA'S *Fastest Growing* FURNACE LINE

NEW GUN-TYPE FLOOR FURNACE

At Last! A fully automatic floor furnace with a trouble-free gun-type burner—Model FL 80—80,000 BTU/HR output! Measures 24" x 32" x 29½" deep. Factory assembled—ready for installation.



SUSPENDED HORIZONTAL

Excellent for special-purpose heating applications - attic, low-basement, ceiling and underneath the floor. Four sizes — 75,000, 110,000, 160,000 and 210,000 BTU/HR output. Factory assembled with hanger posts or base flange stands.

GRAVITY FURNACE

For LOW price homes! Ideal as a replacement furnace! Model GA 75—75,000 BTU/HR output. Measures 52" tall—22" wide—28" in depth. Efficient 3-pass heat exchanger. Factory assembled with full-size bottom plate.

WRITE OR WIRE NOW FOR PRICES AND COMPLETE DETAILS

Delta Heating Corporation

TRENTON 8, NEW JERSEY

the editor's notebook

(continued)

The new annual capacity figure of the world's largest steel industry is an increase of 25,656,910 tons, or about 30 per cent, in the seven postwar years as a result of steel companies' large scale expansion and improvement programs. It is a gain of over 35.9 million tons, or 44 per cent, in 13 years, since the start of 1940.

The institute announced that the annual capacity is rising toward an expected figure in excess of 123,000,000 tons of ingots and steel for castings. The steel companies' present programs of expansion and improvement indicate that the capacity will be raised by more than 4 million tons during 1953, more than 1 million tons in 1954 and about 500,000 tons after 1954.

The new annual steel capacity figure effective January 1, 1953, is an increase of 17 million tons since the start of the Korean War in the middle of 1950. The almost 9 million ton increase in steel capacity during 1952 exceeds by almost 4 million tons the best previous yearly increase, made during 1915.

The new weekly capacity figure, on which the weekly operating rate of the industry will be based, is 2,254,459 net tons of ingots and steel for castings, compared with 2,077,040 net tons at the start of 1952.

NPA May Lift Building Materials Ban

REMOVAL OF THE BAN on building materials requirements for recreational, amusement, and entertainment construction which has existed during the past two years may be effected in 1953, according to a forecast by the National Production Authority.

In making the announcement, NPA Building Materials Division Director John L. Haynes, said:

Enthusiastic reception by the public explains the higher sales frequency of the Sundstrand all-electric oil burners.

With a Sundstrand, the most modern concepts of warm air heating are realized.

. . .That's not enough; with a Sundstrand, initial low-cost is matched by long-span oil burner performance.

★ DURABILITY
★ DEPENDABILITY
★ COMPACT DESIGN
★ OVERALL ECONOMY
★ QUIET OPERATION

. . .These values and the Sundstrand reputation for the finest in oil heating add up to complete customer satisfaction. Foot or bracket mounted, all Sundstrand oil burners are listed as standard by Underwriters' Laboratories . . . and meet all state and local requirements.

A leader in oil heating for 33 years.

write to

SUNDSTRAND ENGINEERING CO.
ROCKFORD, ILLINOIS

the editor's notebook

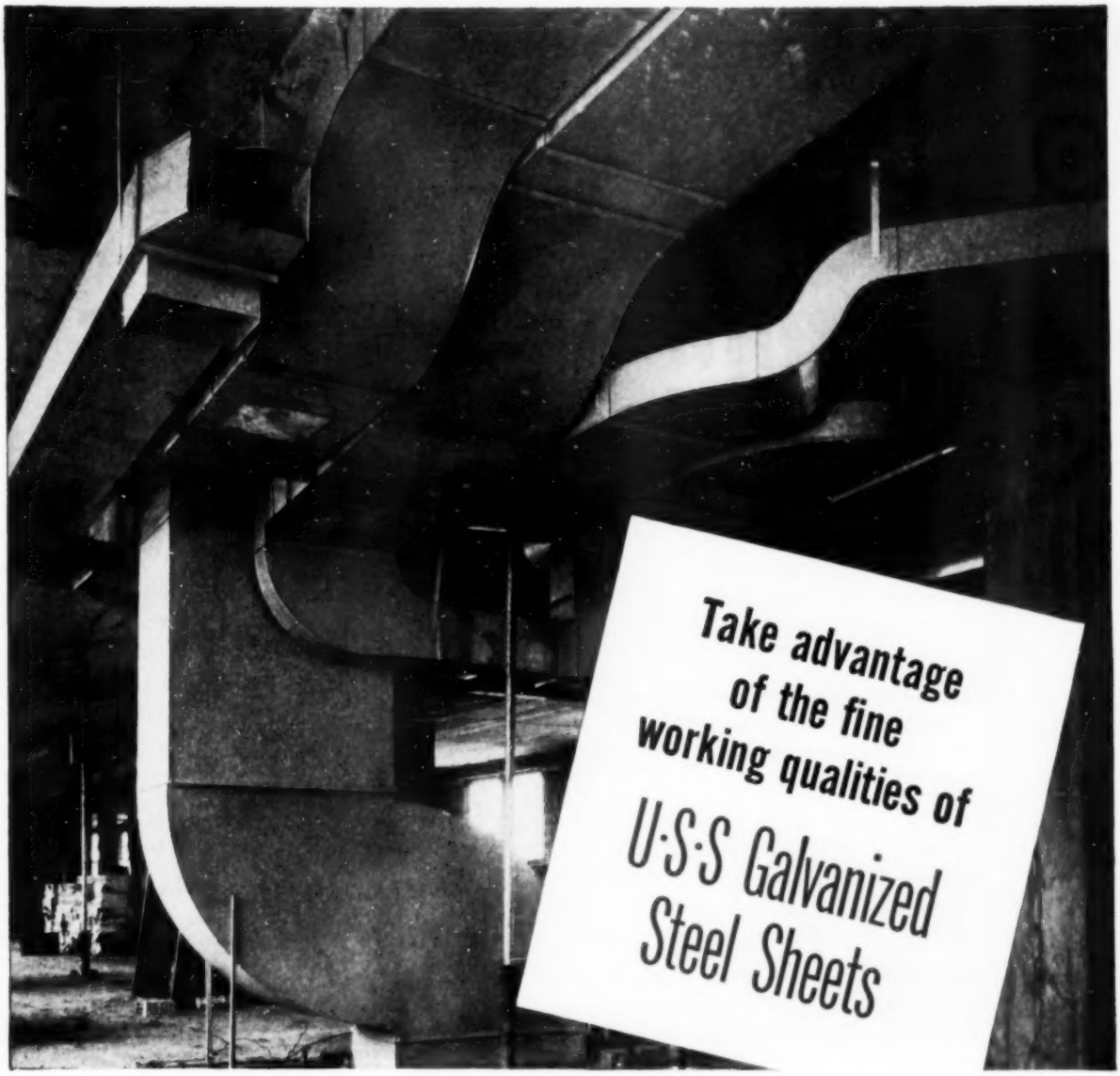
(continued)

"Erection of theaters, bowling alleys, skating rinks, playgrounds and other places of recreation in 1953 may amount to a value of one-quarter billion dollars. New construction activity has not been permitted for such structures in the period October 26, 1950-January 1, 1953, so that all possible structural steel could be made available for industrial expansion and other defense construction."

Reviewing the work of the Building Materials Division of NPA in 1952, the director stated his group allotted almost four million tons of steel, about 300 million pounds of copper and 350 million pounds of aluminum to the approximately 6,000 manufacturers in the building components field. Steel was allotted in the 4th quarter of 1952 at a level of 60 per cent of base usage (1st half, 1950) for most products. Some consumer items, however, like store fronts and metal trim, were allotted 50 per cent of base, according to the report.

Test Procedures for Power Roof Ventilators

THE NATIONAL Association of Fan Manufacturers, Inc., and the Propeller Fan Manufacturers' Association have announced the adoption of test procedures for power roof ventilators having either centrifugal or axial type wheels. The object of such tests is to obtain performance for published data and for general application. To provide for testing power roof ventilators with and without inlet duct, there are provided four arrangements of test equipment illustrated on plates. Test procedures are outlined in NAFM Bulletin No. 110, *The Standard Test Code for Centrifugal and Axial Fans* and NAFM Bulletin No. 113, *Laboratory Standards*.



YOUR finest workmanship will go to waste unless it's combined with the highest quality material you can obtain. For ductwork installations, that means U·S·S Galvanized Steel Sheets.

True bends, tight seams and neat joints—all the characteristics of a top-notch job—are quick and simple with these quality sheets. Bending, rolling, cutting, stamping and soldering can be accomplished in minimum time with the most satisfactory results.

For finest performance—both in the fabricating shop and on the finished job—make it a point to use U·S·S Galvanized Steel Sheets. And tell your customers the brand you're using; they recognize that the U·S·S name stands for the best in steel.

U·S·S GALVANIZED STEEL SHEETS

UNITED STATES STEEL CORPORATION, PITTSBURGH · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

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USS

UNITED STATES STEEL

MEET BRYANT'S NEW "Command-Aire" TWINS

. . . now in mass production to make year 'round home conditioning a mass-market sales opportunity . . . for you!

Home builders and home buyers everywhere are enthusiastic about the new Bryant "Command-Aire" Twins. Here's why:

- They're being mass-produced to bring the price of *complete* home comfort within the budget of *average* home buyers—*30 to 50% less than heretofore!*
- They're independent heating and cooling units matched in appearance and size. Builders can install the furnace first and offer the addition of air conditioning immediately—or later—according to the convenience of the buyer.
- They're being extensively advertised on national and local levels—even right on the homesite—to pre-sell thousands who will buy new homes this year.
- They're being featured in a giant special promotion for builders, launched at the NAHB Show in Chicago, to build extra business for you. And consistent, wide publicity and promotion will assure a gratifying replacement business.

Here is a new, big-volume, high-profit sales opportunity for *you.*

Homeowners want year 'round conditioning because it adds extra enjoyment . . . extra resale value.

Bryant's "Command-Aire" Twins now make it possible for them to have it at a price millions can afford.

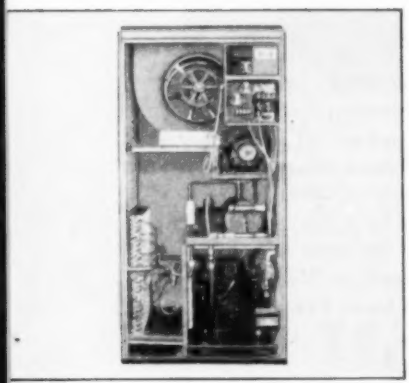
You stand to profit accordingly!

Your nearby Bryant Distributor will be happy to provide complete details. Or write direct to Bryant Heater Division, 17825 St. Clair Avenue, Cleveland, Ohio.

Powerful promotion pre-sells "Twins"—Extensive national advertising and local promotion . . . liberal use of homesite sales aids . . . plus a flood of local "Command-Aire" Home publicity stories will pre-sell the "Twins" to hundreds in your area.

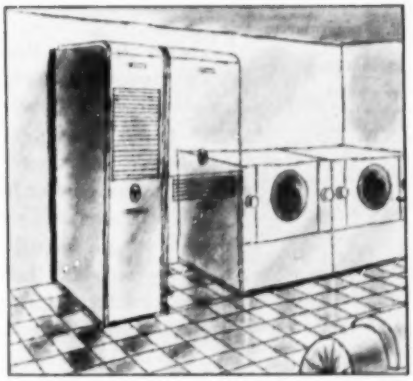
bryant *means business... better business for dealers*

The "Command-Aire" Twins consist of a new Bryant Forced Warm-Air Furnace (*gas* or *oil*) combined with a new self-contained Bryant 2, 3 or 5-ton Air Conditioner. Many combinations of heating and cooling capacities are available.



Air Conditioner is independent unit with its own blower . . . eliminates need for air to pass through both units . . . improves both heating and cooling efficiency.

Five-year warranty on the hermetically sealed compressors of the 2 and 3-ton "Command-Aire" cooling units has tremendous appeal to buyers.



One cooling unit sells hundreds! Builder can install "Twins" in his model home and leave space for the cooling unit in the others—where *your* prospects will live.

Roger Booth, left, owner of Heating, Inc., Colorado Springs, talking to Honeywell sales engineer Bob Forster

"The key to selling Electronic Moduflow is this little outside-the-house thermostat"

– says Roger Booth of Colorado, who does a half-million a year in home heating alone

"I always take a Honeywell Electronic Weathercaster along with me on sales calls . . . and remove the cover while I'm talking.

"I've found customers never fail to ask how it works and where you put it, which are the questions I wait for.

"Because then I can tell them how this control is actually installed *outside* the house; how it regulates the burner, automatically compensating for temperature changes *before they are felt* inside the house.

"I've also discovered a lot of customers can't get over the fact that there's nothing more than a tiny, supersensitive coil of wire inside a Weathercaster – instead of some complex mechanism they cannot understand.

"We usually wind up out-of-doors, discussing possible locations for it. And when the conversation gets to the point where they tell me where *they think* the Weathercaster belongs – brother, I know I've made another Moduflow sale!"

H HONEYWELL

Another Plus-Profit Idea from Honeywell

Heating dealers — Here's why electronics is the greatest advance in home heating in years!

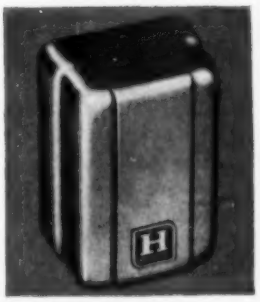
Tests show... and most heating men know ... that if indoor temperature is *merely held constant*, as the temperature outside falls, you feel chilly and uncomfortable.

This is because, as outside temperatures drop, and the walls of a house become colder, the rate of heat loss from the body through radiation becomes greater. Electronic Moduflow solves this problem by *raising* the temperature control point just enough to compensate for the temperature drop outside; and conversely, by *lowering* the control point as the temperature outside rises.

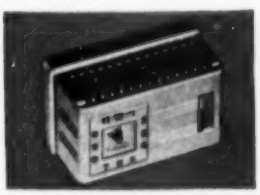
To illustrate, take the person who is comfortable with an inside thermostat reading of 71°, when it's 40° outside. Well, if it were 0° outside, it would have to be 74° *inside*, to give him the *same degree* of heating comfort. Electronic Moduflow thus accomplishes—automatically—what people have been trying to do for years through constant manual thermostat adjustments!

Electronic Moduflow is *28 times more accurate* and sensitive than ordinary mechanical systems of control. It operates the burner in *timed cycles*, matching exactly the needs of the weather; thus providing virtually constant air circulation and eliminating hot ceilings and cold floors.

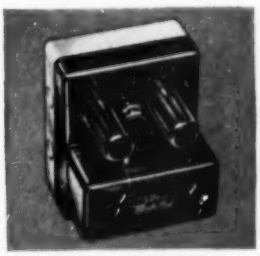
Electronic Moduflow is remarkably simple to install for any heating dealer or electrician. It has a simple circuit, is easy to wire and adjust. And since the system is electronic it has few moving parts and almost nothing that can wear out or break down. Try it!



Electronic Weathercaster. Mounted *outdoors*, senses changes in the temperature electronically and sends signals inside to Electronic Relay Amplifier.



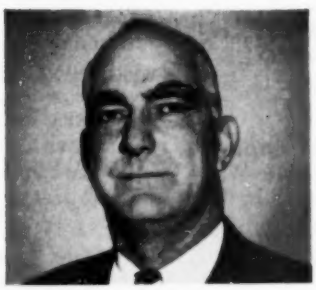
Electronic Chronotherm. Mounted *indoors*, senses temperature changes inside house electronically and sends signals to Electronic Relay Amplifier pictured below. Completely automatic—you never touch it. Also provides automatic night set back, automatic morning pick up.



Electronic Relay Amplifier. "Interprets" signals from inside and outside thermostats, correlates and balances them, and sends them on to heating plant.

Read what Roger Booth's customers have to say about Electronic Moduflow . . .

Mr. Howard Hart, Colorado Springs, says: "We don't know we have a heating system any more. We live in perfect comfort regardless of how cold it gets. With Electronic Moduflow everything is done for us automatically."



Mr. F. L. Davis, Colorado Springs, says: "Wonderful! That outdoor thermostat is almost unbelievable. It *keeps up* with the weather without our ever doing anything. We've never had our home this comfortable before."

MINNEAPOLIS **Honeywell**

First in Controls

Announcing New G-E Year-Your Door-Opener to

Get your full share of builder and home modernization business with first completely matched, Pre-"Paired" line of heating and cooling in the industry!

Prepare now for the biggest year in the history of heating and cooling with General Electric's compact new factory-packaged Year-Round Air Conditioners! They're your greatest opportunity to crash the tremendous builder market...and boost your share of the booming home modernization market!

Easy to stock...and sell! Air conditioning sells houses—that's why builders are showing so much interest. And here is the easy way to get into the cooling business. The G-E line is super-flexible! Over 190 combinations can be made up from just a few basic units. Heating and cooling units look alike, fit together to make a single package using only one blower.

Outstanding features! Units are so compact they fit anywhere—basement, utility room, crawl space, attic, closet—make it easier for you to close sales with space-conscious builders. Dependability is sure with G.E.'s new factory-sealed hermetic cooling system, G. E.'s famous economical heating system.

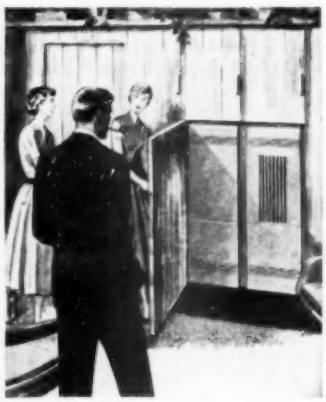
G-E Air-Wall System adds extra sales appeal! Here's a bonus in glamour and comfort. G-E *Air-Wall* System—already proved a heating seller with builders—is perfect for cooling, too. The same space-saving ducts deliver both heating and cooling. The same handsome G-E *Air-Wall* Register, located low on outside walls, performs ideally for cooling as well as heating. Women, especially, like the freedom of furniture and drapery arrangement...the absence of unsightly high-wall outlets...the fact that carpets don't have to be cut, as with floor registers.

"Add-to" Plan makes your heating sales soar! Here's a terrific sales tool for your heating business! If the builder is not ready to invest in year-round air conditioning, he can install a G-E Gas or Oil Furnace and *Air-Wall* System alone, at competitive heating prices. And his homes become Pre-"Paired" for summer cooling! He has a wonderful new sales feature to help sell his homes at no extra cost—for G-E air conditioning can be added anytime! The builder has a new sales tool—the homeowner is protected for the future when air conditioning will be considered a necessity in every home. *You* sell more heating, and you pave the way to profitable cooling sales in the future. Find out about your opportunities with G-E Home Heating and Cooling today!

GE AIR WALL*
HOME HEATING & COOLING
IT'S PRE-"PAIRED"

DECORATOR'S DELIGHT—*Air-Wall* Registers blend into any setting...allow freedom in arranging furniture and draperies because they spread a protective wall of warm or cool air upward—don't blast it straight out. No carpet-cutting required.

OVER 190 COMBINATIONS from which to choose! Cooling from 2 to 5 tons. Gas heating from 48,000 to 168,000 BTUH output. (Types of gas: natural, mixed, mfd., LP and LP-air.) Oil heating from 60,000 to 155,000 BTUH output.



Round AIR CONDITIONER... New Profits in '53!

Here is the attractive, compact G-E Year-Round Air Conditioner which recently scored a tremendous success at the 1953 National Association of Home Builders Exposition in Chicago. Extremely compact, handsome in appearance, all-new G-E Furnace (right) and all-new G-E Home Cooling Unit (left) fit together in a single, integrated package. Sizes and combinations to fit every climate, any home.

A G-E Leadership Franchise puts you ahead

IN PRODUCTS: Unique *Air-Wall* System; packaged home cooling; quick-comfort, fuel-thrifty gas and oil furnaces; outstanding quality at a fair price.

IN CONSUMER PREFERENCE: Surveys prove the General Electric name enjoys tremendous public acceptance.

IN ADVERTISING: Powerful national advertising aimed at consumers and builders, timely action-packed sales programs.

IN ORGANIZATION: Experienced engineering, sales and service assistance, and continuous up-to-date training programs.

A G-E Leadership Franchise is a basic business asset. Write us today—there may be an opening in your area.

You can put your confidence in—

GENERAL ELECTRIC

*Reg. trademark of General Electric Co.

General Electric Company, Section AA-7,
Air Conditioning Division, Bloomfield, N. J.

Please tell me more about my business opportunities with a G-E *Leadership Franchise.*

NAME.....

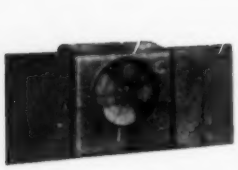
COMPANY.....

ADDRESS.....

CITY.....ZONE....STATE.....

Get Aboard

A TYPE AND SIZE FOR EVERY RESIDENTIAL AND

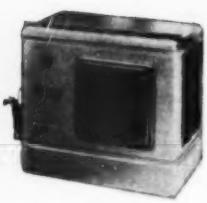


FC-10-P

F-15-D

FC-15-P

B-18-D

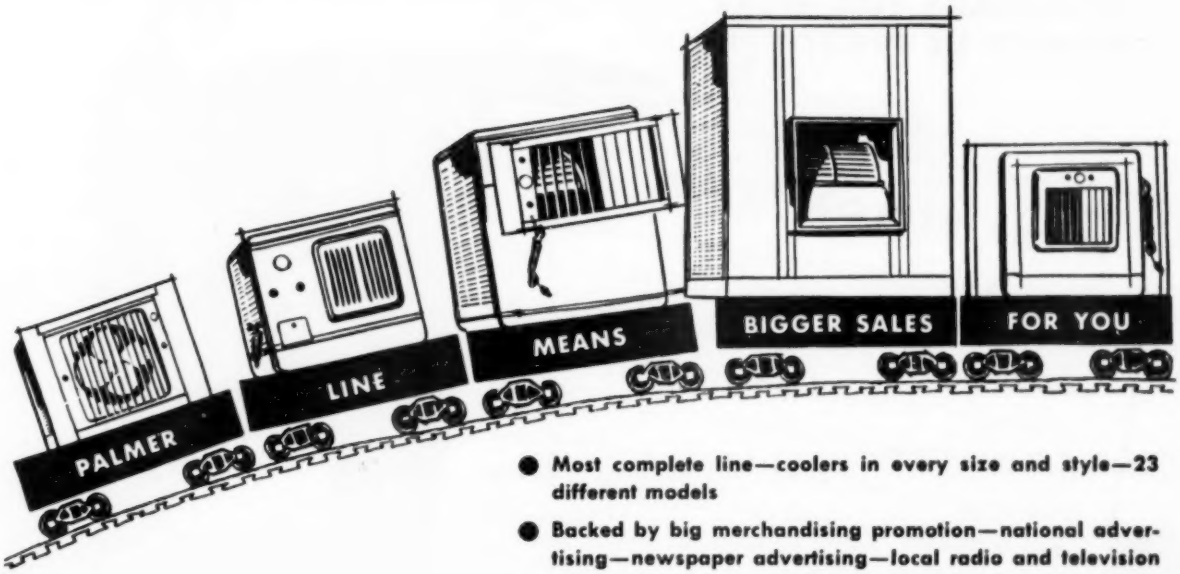


BC-10-P

the Profit Line

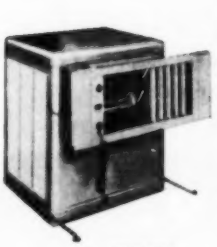
PALMER COOLERS WITH BUILT-IN SALES APPEAL

AMERICA'S BEST KNOWN COOLERS



- Most complete line—coolers in every size and style—23 different models
- Backed by big merchandising promotion—national advertising—newspaper advertising—local radio and television
- Modern styling with all improved designed features. Backed by advanced newly styled line—improved design—research and engineering
- A real merchandising policy that means bigger sales—that assures bigger profits

COMMERCIAL NEED



BV-32

B-200

FOR BIGGER SALES—BIGGER PROFITS
MAIL THIS COUPON...

Palmer Manufacturing Corporation
2200 W. Filmore St.
Phoenix, Arizona

Please send me information on Palmer Coolers. I am interested in
( ) A Distributorship ( ) A Dealership

Name.....

Company.....

Address.....

City.....*Zone*.....*State*.....

AA2

The Incomparable... Complete

VICTOR

"FIN" FURNACE LINE

WILL MAKE YOU MORE MONEY IN 1953!

WHAT VICTOR "FINS" DO!

Air to be heated must rub on a hot surface. More hot metal heats more air . . . FASTER. VICTOR Patented, exclusive, fuel-saving fins furnish many square feet of additional hot metal for the air to rub heat from faster. (In a 24-inch furnace the additional metal in VICTOR FINS would measure 23 feet long by 2½ feet wide.) This additional hot metal gives the user fuel savings from 20 to 30%; and gives YOU an exclusive selling feature that is the fastest sales closer on the market.

NOTE: An EXCLUSIVE VICTOR franchise gives you a line of Gas, Oil, and Coal furnaces in nearly 100 models and sizes for every type installation . . . a quality line that takes you out of the competitive class. Beauty, quality, versatility, engineering, and more profit are yours . . . with VICTOR. Write us TODAY!

"Quality Furnace Builders Since 1890"

Investigate VICTOR, NOW!

There are still some exclusive territories open. Find out about the complete VICTOR line. All VICTOR Gas, Oil, and Deluxe Coal furnaces are WARRANTED for 15 years.

HALL-NEAL FURNACE CO.
1322-42 NORTH CAPITOL AVE., INDIANAPOLIS 7, IND.

News Round-Up

Construction Contract Awards at New High

CONSTRUCTION CONTRACT awards in the 37 states east of the Rockies in 1952 broke all existing building records, topping the previous all-time high set in 1951, according to F. W. Dodge Corp. reports. The 1952 total was $16,774,936,000, or 6 per cent greater than 1951's $15,751,131,000. Contributing significantly to the overall total was the year-end heavy engineering figure of $3,412,368,000, which was up 25 per cent over 1951's comparative total.

Residential awards for 1952 totaled $6,667,504,000, or 7 per cent higher than in 1951. Non-residential awards were down 2 per cent from 1951.

In December, total construction awards were $1,467,384,000, or 18 per cent more than in November, and 19 per cent more than December 1951.

Residential awards, at $438,530,000, were 17 per cent less than November, but 27 per cent more than December, 1951.

Non-residential awards were $709,100,000, 54 per cent over November and 20 per cent over December, 1951.

Heavy engineering (public works and utilities), at $319,704,000, was 23 per cent more than November and 8 per cent above December 1951.

New Records Achieved By Gas Industry in 1952

APPROXIMATELY $1.2 billion was spent in 1952 on the gas industry's expansion program, according to Frank C. Smith, president, American Gas Association. Of this amount about $1 billion was devoted to the construction of new facilities and the expansion of the present natural gas pipeline systems.

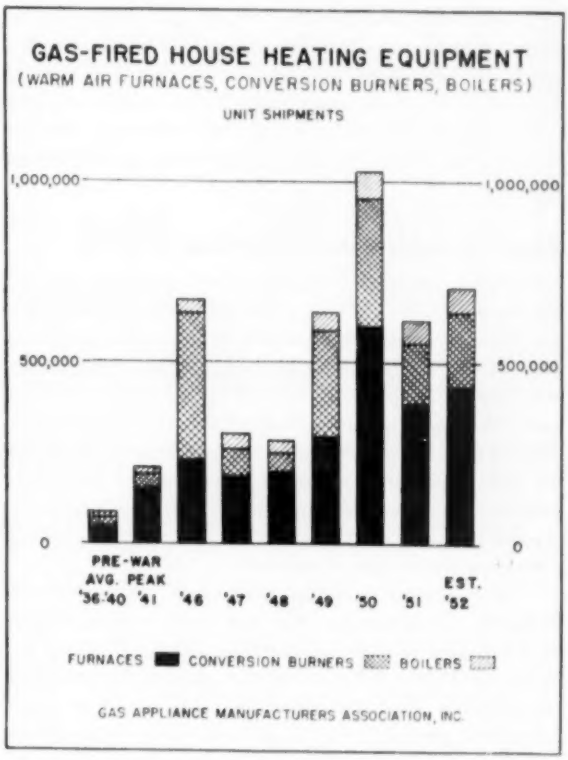
The gas utility companies were serving 27,019,000 customers at the end of 1952, including about 314,000 LP gas customers served directly by gas utility companies. This was a gain of 1,523,000 customers, or an increase of 6.0 per cent over the 25,496,000 customers on gas utility lines at the end of 1951.

More than 20,028,000 customers were served with natural gas at the year-end. This was a gain of 16.2 per cent over 17,239,000 natural gas customers a year earlier.

There were 24,914,000 residential gas customers on gas utility lines at the end of 1952, an increase of 6.0 per cent over a year ago. It is estimated that nearly 6,250,000 additional customers are being served with LP gas in areas not served by the gas utilities.

Revenues from sales of gas were $2,455,022,000 in 1952, a gain of 10.2 per cent over the $2,208,109,000, achieved in 1951. Natural gas sales revenues were $1,951,735,000, a rise of 17.1 per cent over the previous year. Because of changeovers in important areas, manufactured and mixed gas revenues declined 10.9 per cent to total $181,012,000 in 1952.

In the field of gas house heating appliances, the industry made an important gain, with shipments totaling more



ESTIMATES indicate that in 1952, unit shipments of gas fired house heating equipment reached the highest level since the peak year of 1950

than 700,000 central heating units, compared with 615,000 of such units shipped from factories in 1951.

Construction of more than 5,800 miles of natural gas

News Round-Up

pipeline was authorized by the Federal Power Commission in 1951, and approximately 5,000 more miles were authorized for construction in 1952. Applications for about 13,500 miles of additional pipeline were approved by the Commission or were pending at the close of the year. These additions bring the nation's natural gas pipeline system of gathering, transmission and distribution lines to total about 342,500 miles.

The association estimates that approximately $1.7 billion will be spent on new construction and plant expansion in 1953. The bulk of the projected construction will be in the natural gas branch of the industry, with about $1.57 billion of the total being devoted to expansion of production, transmission, underground storage and distribution facilities for natural gas. While several major transmission lines are planned, it is believed that much of the industry's expansion effort will consist of increasing the horsepower capacity of compressor stations, looping present lines and other measures intended to conserve materials and reduce costs in expanding capacity.

Record Aluminum Output Forecast for 1953

THERE WILL BE plenty of aluminum for all who want it before the middle of 1953, unless there is an extension of hostilities, according to Richard S. Reynolds, Jr., president of the Reynolds Metals Co. "With the industry continuing to expand its capacity at a record pace," he said, "the supply situation in 1953 should be much easier than at any time since the Korean war began. Although the 1952 production, estimated to be close to 1.9 billion pounds, sets a new all-time peak and is 11 per cent greater than last year's output, it does not fully reflect the expansion already completed.

"The big surge in actual production," Mr. Reynolds declared, "is coming in 1953 and 1954, with an output of 2.5 billion pounds expected in 1953 and about 3.0 billion in 1954. When all of the planned expansion is completed, in 1954, this country's capacity will be about 3.5 billion pounds — a 127 per cent jump since Korea and almost ten times as much as in 1939.

"The markets for aluminum continue to grow rapidly as it becomes more plentiful and its usefulness and relative low cost gain recognition by American industry. In the few years since World War II, aluminum has achieved the status of a major basic metal. Aluminum's new prominence and importance is sharply defined by the decision during 1952 of two leaders in the non-ferrous metals field to invest over $200,000,000 in aluminum producing and fabricating facilities. With aluminum becoming more readily available, many new uses are developing and the industry will be able to embark once again on an aggressive selling and market development campaign."

Decontrol on Copper Allocation Urged

THE BRASS MILL Industry Committee recently recommended discontinuance of government controls on copper allocation and copper prices.

The industry is not satisfied with the existing ceilings on brass mill products prices and the so-called 60-40 per cent split as between distribution of domestic and foreign copper, committee members said. An arrangement effective July 1, 1952 permitted U. S. brass mills to pass through 80 per cent of the price differential on foreign copper in excess of the domestic price.

At the meeting, figures shown indicated that the average division between domestic and "other" copper receipts for 3rd quarter 1952 allocation was 53.6 per cent domestic and 46.4 per cent foreign per month.

Continuation of this arrangement would have an adverse effect on the industry's producing ability and impose a financial hardship, committee members said.

NPA said this situation would be brought to the attention of the appropriate Government agency.

Nickel Remains in Short Supply

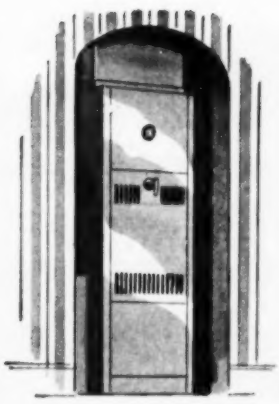
REQUIREMENTS for defense and for the national stock pile are such that none of the increased nickel production may be made available for uses other than direct military production according to a recent issue of the *Defense Production Record*.

The primary nickel distribution policy, determined by the Defense Production Administration and outlined by that agency to NPA, states that allocations for civilian and defense-supporting uses may not be higher than those which were obtained during the 4th quarter of 1951. In line with this policy, increases in the production of nickel are used for direct military production, or are assigned to the stock pile.

Discussing the nickel shortage, NPA officials pointed out that the stock pile objectives are far short of attainment; that greater quantities of nickel are needed in the manufacture of jet engines in order to make the alloys which must be used to withstand the high temperatures they generate.

SU-30-G
85,000 BTU
input per hour

SU-35-G
110,000 BTU
input per hour



AGA Approved!

for alcove and closet installation

Gas-fired RICHMOND winter air conditioner

Where space is tight, use the Richmond SU-G, gas-fired, vertical winter air conditioner . . . ideal for the small ranch-type installation.

Now the SU-G is approved by the AGA for alcove and closet installation. When ordered for this type of installation our standard unit is especially adapted to meet the rigid AGA requirements. When ordering the Richmond SU-G for closet or alcove use, be sure to state that fact.

Remember that the SU-G can be furnished with a bottom filter rack as optional equipment at no extra charge. And remember these special features: Remote pilot igniter (standard equipment) for convenience and safety in lighting burner from outside of furnace...burner and controls quickly and easily removable as mounting plate is held securely in place with four nuts. When space and economy count . . . count on the Richmond SU-G.

RICHMOND
PLUMBING & HEATING

RICHMOND

RICHMOND RADIATOR CO.—AFFILIATE OF STANDARD SANITARY CO.

AA-2

Richmond Radiator Company
19 East 47th Street, New York 17, N. Y.

Please send me full information on Richmond SU-G gas-fired winter air conditioners.

Name.....

Company.....

Address.....

4 more Sales-Getters for '53

Luxaire® Gas-Fired Unit Heaters

Built in 4 Popular Sizes

Model X
Factory Assembled and Wired

60,000 B.T.U.
90,000 B.T.U.
115,000 B.T.U.
170,000 B.T.U.

For Natural — Manufactured — Mixed and Liquefied Petroleum Gas

The Biggest Value in Unit Heaters

Here's your big opportunity to get your share of sales in the big-unit heater market with the New Luxaire gas fired Unit Heater.

And — only after exhaustive tests have proved that Luxaire ingenious design — construction — operating — installation — servicing features are the biggest value in gas fired unit heaters was production started.

Built in the most popular range of sizes that provide the necessary flexibility for any installation, Luxaire Unit Heaters are:

1. **Sturdily constructed! Welded steel heating elements have built-in draft hood!**
2. **Equipped with Luxaire Ribbon-type Burners for all types of gas and gas mixtures!**
3. **Compact — smartly styled!**
4. **Designed for unusually quick and easy servicing!**
5. **Always attractive with bright enamel finish.**

Every Luxaire Unit Heater installation automatically becomes another salesman for you.

See your Luxaire jobber NOW! Get the complete story! Get the attractive prices! Delay means lost opportunities for you!

THE Luxaire C. A. OLSEN MANUFACTURING COMPANY • • ELYRIA, OHIO

HEATING & AIR CONDITIONING UNITS

Write for this NEW and Comprehensive 72-page PRESS BRAKE catalog

- Applications of Press Brakes
- The Cincinnati Line of Accurate Press Brakes
- Cincinnati Standard Features
- Important Fundamentals in selecting a Press Brake
- Specifications and Dimensions of Cincinnati Press Brakes
- Filler Blocks or Die Holders
- Special Features
- Punching Equipment and Dies

The latest features and developments in the extensive line of Cincinnati Press Brakes are thoroughly covered in this new catalog.

Many varied operations in industry are illustrated. They may suggest applications that bring new economies and increase production in your plant, as they have in many plants throughout the country.

On your request, we will promptly mail to you, the new Press Brake Catalog B-4 X

CINCINNATI

THE CINCINNATI SHAPER CO.

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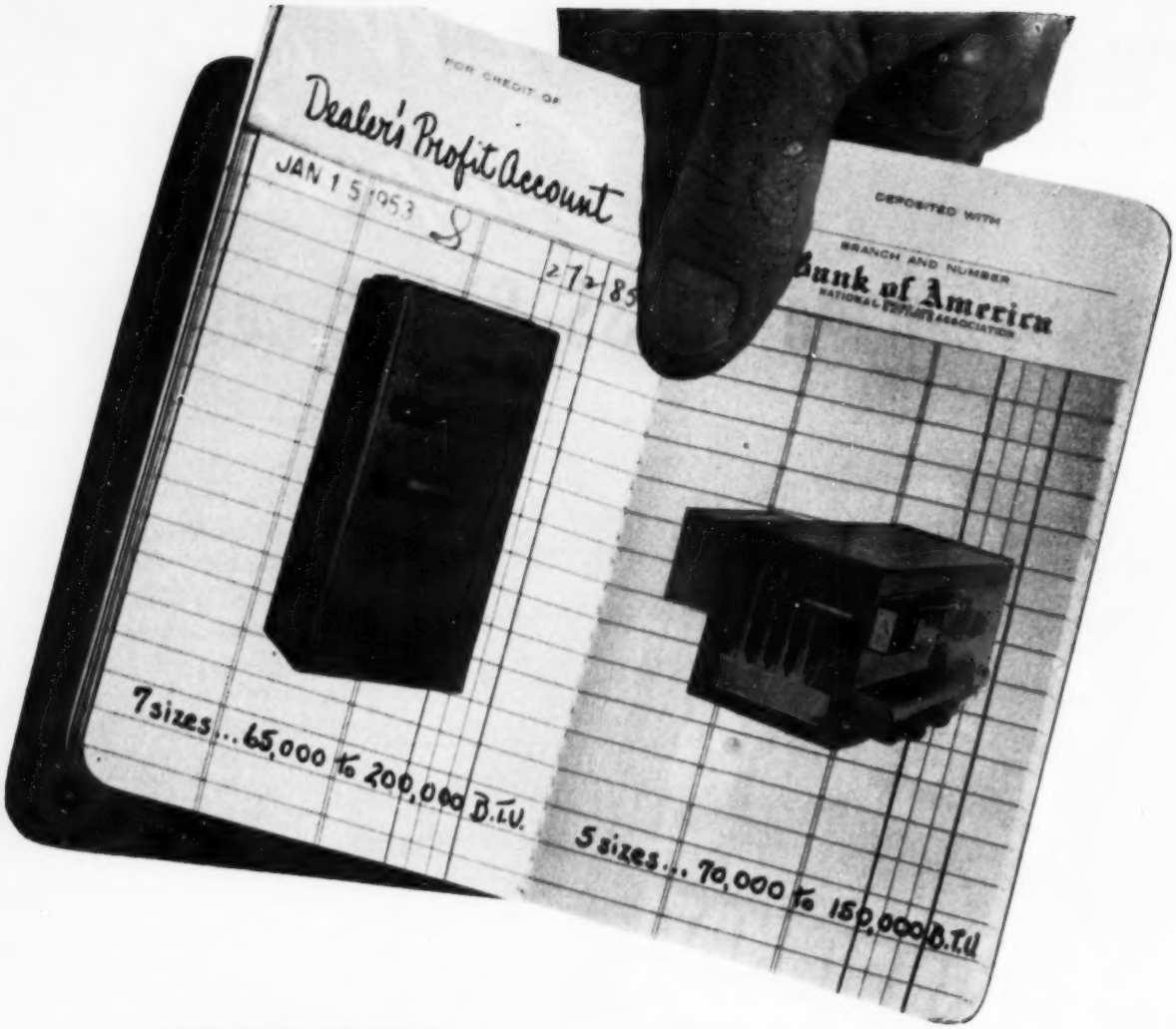

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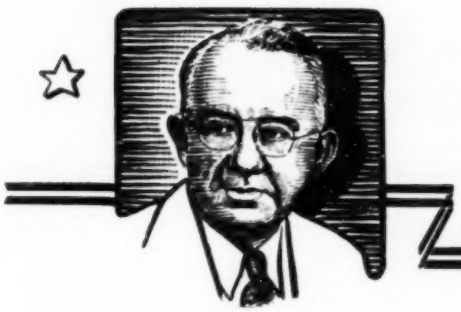


Arnold Kruckman's

Washington Letter

Too Few Apprentices — a Problem for Industry

PEOPLE of the sheet metal industry visiting here recently said that there is no trouble about obtaining sufficient materials, but that the problem of the industry as they see it is apprentices. They thought that the draft is taking the young men who supply most of the potential apprentices in the age brackets now popular with the Selective Service. Some of them seem to have the mistaken information that recently the Federal Government had announced that apprentices in skilled crafts would be exempt. There is no such thing as exemption from the draft under the present law. Every young man physically capable, between 18 and 26, must register. If deferred, these men remain liable for military service to age 35.

Students are permitted, under certain circumstances, to complete their courses at the colleges and universities at which they are enrolled. But a student, like any other young man, is never exempted. His tour of duty in the Armed Services is simply deferred. The student is permitted to finish his course if from year to year the college authorities certify that he is a desirable student. Up to this time, 187,000 college students have thus been deferred. But if their health continues sound, and they have no other qualifying obligations or conditions, at the end of their educational courses they must go into the Armed Services.

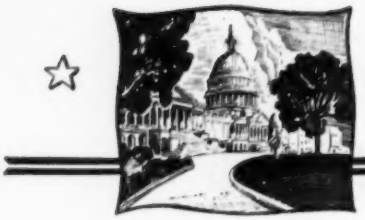
The situation is exactly the same with skilled craftsmen, such as those who are employed by the sheet metal industry. The law specifically provides that they may be deferred if they are employed on what is termed critical jobs in essential industries. The critical employment and the essential industry are clearly and definitely indicated in lists published by the Secretary of Labor and by the Secretary of Commerce at the order of the President. Apprentices employed in other industries, such as the sheet metal industry, may be deferred under some particular and special conditions if it can be proven that they are doing something that in some way is helpful, either in the defense activity or in connection with some other business that serves the paramount public interest and welfare. Usually such deferment is the result of local determinations rather than any national ruling.

Deferment Can Be Renewed

Apprentices engaged in an occupation listed as critical by the Secretary of Labor and employed in an industry listed as essential by the Secretary of Labor may be deferred even though they have only six months of an apprenticeship. Apprentices in other occupations must have had one year of apprenticeship. The utmost length an apprentice may be deferred is 12 months. At the end of a year's deferment, those who sponsor the application for his deferment may apply for another deferment. The application is reviewed, and the review board of Selective Service may renew the deferment for as long as it thinks appropriate, up to one year.

Such deferment can be renewed from year to year if the apprentice is deemed to be necessary at the job which he is doing. In some cases, such as the machine tool industry, it has been found in the public interest and serving the cause of defense that the apprentice be permitted renewals to complete his training and thus to become a journeyman. However, since the great majority of apprentices start training when they are 19 or 20 years old, they are still within the draft age limit when they become journeymen, and are then called into the Service.

Obviously, most young men reason that since they must at some time go into the Armed Services, they might as well go and have it over with when they are first called. It is for this reason that there is such crippling turnover in the supply of apprentices, particularly in



Washington Letter

the metal working crafts. Informal figures supplied by the Department of Labor to Selective Service authorities during discussions of proposed deferment regulations indicated that about 25,000 apprentices would be in the age groups subject to the draft. The total number of apprentices registered as employed in all trades in this country is now 155,000. There are also many voluntary unregistered apprentices.

Survey Replacements for Journeymen

The Bureau of Apprenticeship of the Department of Labor obtains information on apprentices in the sheet metal trade in both manufacturing and construction. There is some difficulty in breaking down the classifications, but by far the greatest number of sheet metal apprentices are in construction. As of June, 1952, there were 7788 registered apprentices in the sheet metal industry. Per contra, the Bureau of Labor Statistics, surveying the building trades industries found, between 1949 and 1951, replacements of journeymen very much favored the apprentices in the sheet metal industries. In 1949, disappearance per journeyman was offset by introduction of 1.4 apprentices. In 1950, the introduction of apprentices as replacements for journeymen was covered by the figure 3.1; in 1951 by 1.6. The replacement ratio per journeyman for the three years ending with December, 1951, was 2.0 apprentices.

Authorities in the Bureau of Apprenticeship point out that in the last few years veterans of World War II have been taking the place of the very youthful apprentices who are the first to be tapped for the draft. It is suggested that during 1950 it was not uncommon to find that the apprentices were in the age brackets from 25 to 27, and that many came within the brackets of 22 and 23 years old. It was not uncommon to find men between 30 and 35 years old. Obviously if they had retained the qualities that enabled them to be trained they were much more acceptable than the younger men, who were so much more apt to be called. Any number of reasons made it almost certain that the veterans would be deferred indefinitely. Also they had certain privileges under the GI Bill of Rights.

Instructions to draft boards are to give careful consideration to applications for deferment when an apprentice is employed in activities having to do with research, or medical, scientific, or other endeavors necessary to the maintenance of national health, safety or interest, when interruption of his employment would be harmful to the activity; or if he cannot be replaced because of a shortage of persons with his qualifications or skill. They also are instructed to be certain the apprentice training program meets the standards of requirements prescribed by the Director of Selective Service and that the apprentice has completed the minimum amount of training as required by the Selective Service; also that he is satisfactorily pursuing his training program and meeting the requirements and standards of performance prescribed.

In a number of occupations, apprenticeship is not recognized, and therefore, the deferment regulations for apprentices do not apply. These include: selling; clerical work; or professional or semi-professional occupation for which entrance requirements customarily include education of college level; or agricultural occupations which include occupations such as the growing of crops, fruits or nuts, and the raising of livestock or poultry.

How Applications for Deferment are Made

Each State Director of Selective Service has wide authority to bend the instructions in order to meet the need of programs that may be peculiar to his region or to some locality within his region. It is under such wide latitude that some employers in the sheet metal industries may occasionally be able to secure deferment for a much needed apprentice. For this reason it is suggested it is wise for any industrial unit that operates a specific training program to register its training program with the State apprenticeship agency; the agency will then issue a certificate stating that the program meets all the standards and requirements which have been prescribed. It is more difficult, however, for those who are operating unregistered programs to secure deferments.

Application for a deferment may be made under Selective Service Regulations by the employer, the joint apprenticeship committee, the union, or a group of employers. Whoever makes the application must submit the certificate and must certify that the apprentice is qualified for deferment by having satisfactorily performed in learning his craft or trade and has completed not less than the required hours of apprentice training. There are regular forms for such application. They may be had from the Bureau of Apprenticeship, U. S. Dept. of Labor, from the Selective Service System, and from

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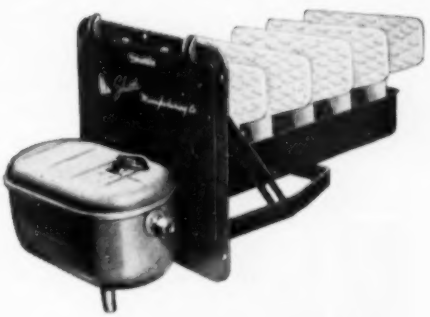

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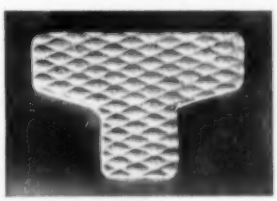

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DESIGNED ECONOMY means the Royal Jet-Aire offers you more sales points . . . plus more built-in labor-saving installation features than any unit.
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the State Director of Selective Service to whom the application must be addressed and sent. The forms issued by the Department of Labor may be obtained from the Bureau of Apprenticeship or the State Director of Selective Service by applying for *Registered Apprentice Training Program Acceptance Request* or *Unregistered Apprentice Training Program Acceptance Request.* Another form, SSS No. 171, has been put out by the Selective Service System. Where possible, forms should be applied for by name, rather than number.

Ansel Cleary, Assistant Director of the Bureau of Apprenticeship of the Department of Labor says he thinks (speaking in the light of the fact that there are 155,000 apprentices) that the deferment program for all crafts and trades apparently has been developed during this emergency period with the least possible friction. He thinks industry, as well as the union and the public, have worked together very smoothly. He feels that whatever difficulties there might have been have been avoided because industry and the unions have managed to be farsighted enough to provide in advance for dealing with the "sand in the human machine." Mr. Cleary and Mr. Edward Goshen, of the bureau, and other people concerned, both in and outside of the bureau, have been constantly working in order to improve the apprenticeship program still further.

The program is an exceedingly important factor affecting the defense structure. The field offices of the Bureau of Apprenticeship work with the State Selective Service officials and with the local draft boards whenever these groups wish technical assistance.

Apprenticeship Program Applied Uniformly

There is almost complete uniformity in the application of the apprenticeship program to all trades and crafts of all industries. However, according to the Bureau of Apprenticeship, the ratio of apprentices to journeymen varies by locality and with different unions.

Mr. Elmer Walker, vice president of the International Association of Machinists, an exceptionally brilliant man, with vision and deep human sympathy, has done much work in connection with the apprenticeship program. He says the ratio of one apprentice to 10 journeymen, which has been quoted occasionally, should be taken as a yardstick rather than an actual practicing formula.

Anywhere or any time a local situation requires that a ratio be reduced, Mr. Walker says authority will be formally given to operate with as low a ratio as one to four or five. He points out that in some shops, particularly in some of the sheet metal industry plants, it is not uncommon for two journeymen to work with one apprentice. However, for the sake of the training of the apprentice, Mr. Walker thinks it is far better for him to work in a shop that operates at a higher ratio. He thinks an apprentice trained under those circumstances gets the benefit of more diverse information from more journeymen. Mr. Walker is unhappy because he thinks there is a tendency for the large plants to avoid the obligation to train apprentices. For

Biggest Thing in Home Comfort Since Central Heating

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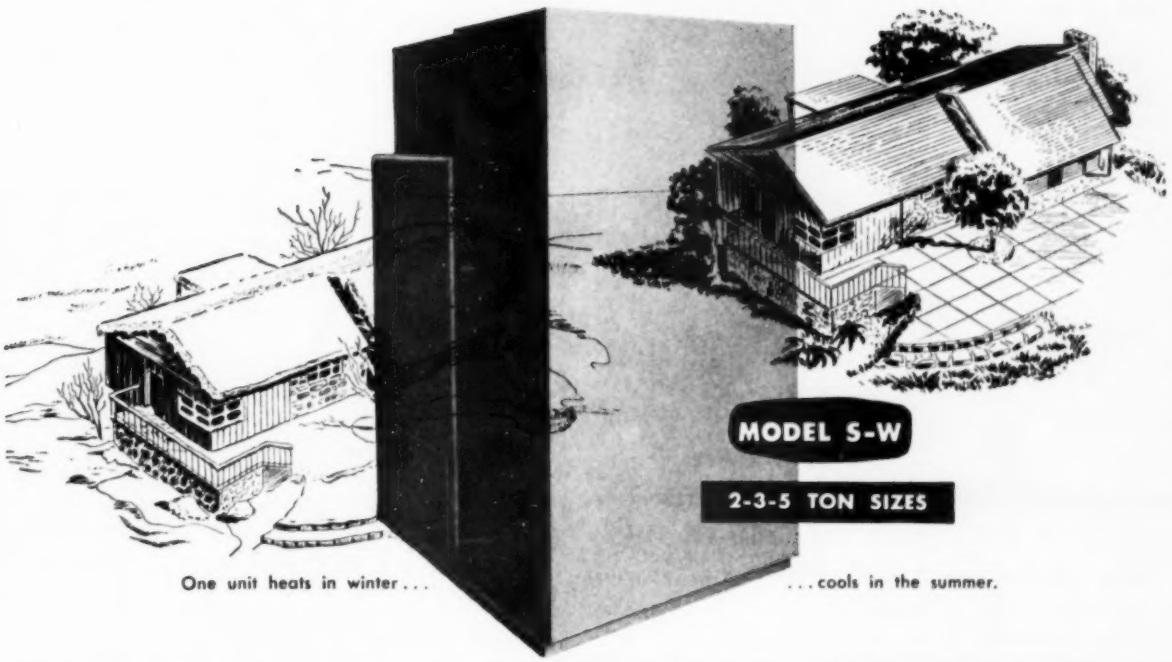

One unit heats in winter . . . . . cools in the summer.

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SIMPLE TO INSTALL — Just a few quick connections and within hours your Typhoon unit is ready to function.

INEXPENSIVE TO OPERATE — Engineered to the point of greatest economy consistent with dependable performance.

QUIET — Completely insulated heavy-gauge steel cabinet and floating spring base assure whisper-quiet operation.

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When you install gas burning appliances, you'll want this useful handbook containing complete, up-to-date information on gas venting practices plus many helpful installation tips. The findings presented are based on extensive engineering research recently completed by the Metalbestos Division, William Wallace Company, with the assistance of Stanford Research Institute.

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various reasons, he says, the large plants try to shift the responsibility of apprentice training to the smaller shops.

New Bill Affects Apprentices' Standing

Senator Styles Bridges (R.,N.H.), one of the Republican leaders, has introduced Bill S. 245, which would authorize promotion from apprentice to journeyman in the Government service to be made on a permanent basis, and provide credit for promotion and retention purposes for graduate apprentices. The law, if enacted, would apply to any department or independent establishment or agency in the executive branch of the Government which has a prescribed course of apprenticeship training for any of its employees, particularly those in a skilled trade or craft.

As the law now stands, any promotion from apprentice to journeyman is tentative, or temporary. The bill provides that all such graduate apprentices shall be regarded as journeymen from the time they became an apprentice, thus increasing their qualifications for supervisory positions.

Union leaders have been telling Government officials that efforts to organize workers into new unions have dropped to the lowest level in 15 years. The recent election is considered responsible for some of this condition. Union leaders themselves publicly place the blame on the Taft-Hartley Act, the high employment levels, and the fact that there has been a shift to the right in the thinking of the workers, and various other closely related factors.

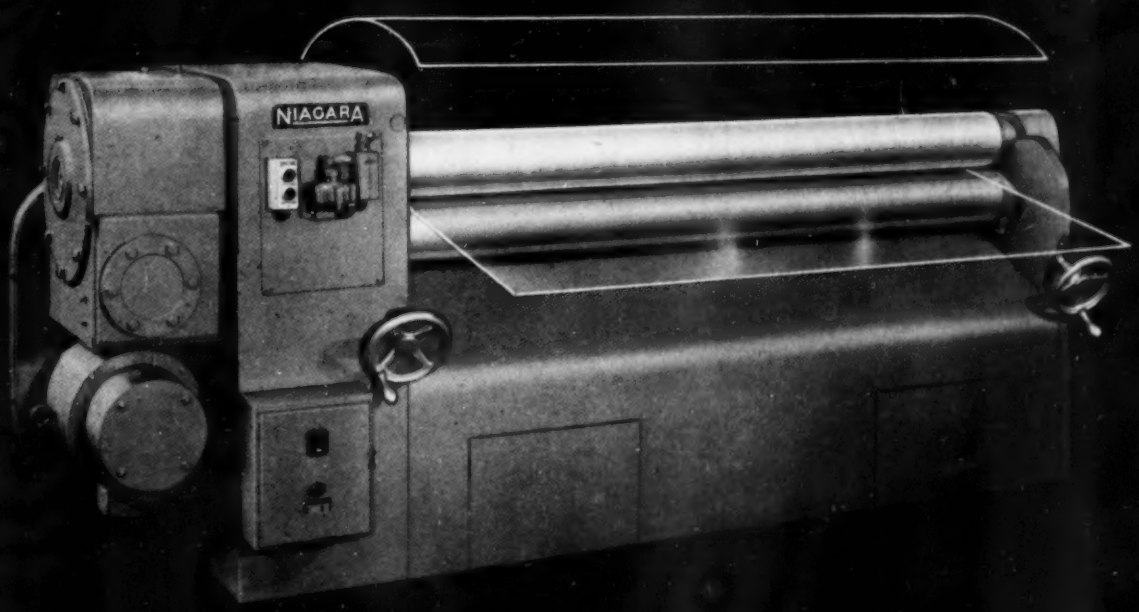
Consumers' Price Index Revised

The newly revised *Consumers' Price Index*, published by the Bureau of Labor Statistics, has prompted the AFL to warn all affiliated unions to exercise the utmost caution in negotiating new wage agreements. CIO's Walter Reuther has used the revised index as the basis for a demand for upward revision of the automobile workers' contracts, despite the fact that the present contracts still have a long time to run. It is anticipated here that Mr. Reuther may force a strike, according to reports received.

The *Consumers' Price Index*, as revised, will use the level of prices in the 1947-49 period instead of, as formerly, changes from the level in 1935-39 period. This particularly hits those contracts which have escalator clauses. The unions insist recalculation is necessary. Under the new index, prices in a number of large cities will be used and prices in an even greater number of small and medium-size cities will be applied, some with a population as few as 2500. The new index uses a different market basket of goods and services, more typical of present-day expenditures. The index provides for the pricing of home ownership costs, by allowing for the effect of rentals of new homes, and by the pricing of restaurant meals, also used cars and other items not previously separately priced. Income taxes are not covered in the revision.

NIAGARA

ANNOUNCES



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Installation hangers are welded direct to the heating element.

Provision for quick, easy servicing is exceptionally well engineered.

And — a popular range of sizes, attractively priced to meet competition is NOW available at your Moncrief jobber's warehouse.

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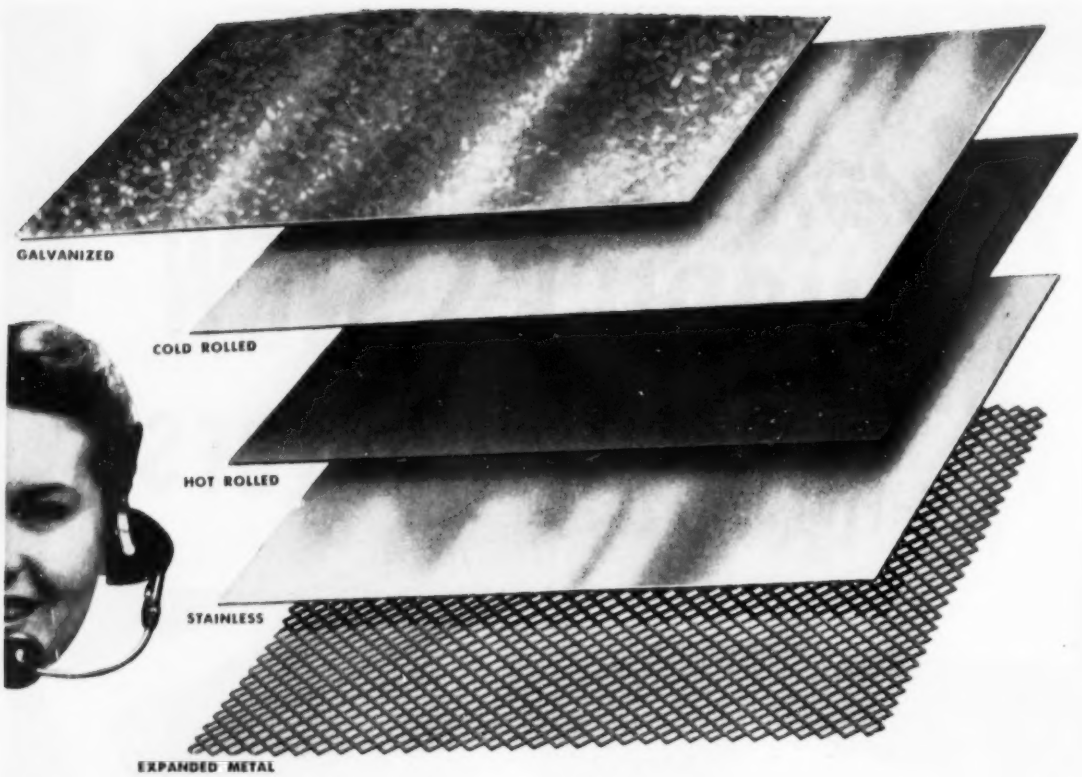

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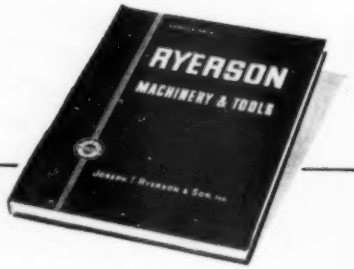
So call your nearby Ryerson plant next time you need steel for sheet metal work. We can undoubtedly meet most of your requirements promptly.



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AMERICAN ARTISAN

editorial

Seeing the Show

AT THE RECENT meeting of the Warm Air Heating and Sheet Metal Contractors' Association in St. Paul, we talked to many people, all of whom were very interested in the prospects of adding summer cooling to the services now offered their customers. Many planned to come to Chicago to see the International Heating, Ventilating and Air Conditioning Exposition, for the express purpose of selecting a line of summer cooling equipment to add to their present lines. The purpose is to offer the home owner a selection of equipment from the entire air conditioning line — equipment that will heat, cool, humidify or dehumidify and filter the air being supplied to the living area. There are many possible combinations of the equipment. At the exposition, one manufacturer showed a line of year 'round equipment comprising over 200 packages that would fit almost any situation encountered by the heating dealer. The heating equipment offered could be adapted to natural, manufactured or mixed gas, propane, butane or fuel oil; the cooling equipment ranged through 2, 3 and 5 ton air conditioners.

One heating dealer attending the show told us that before he came to Chicago he was sure he wanted no part of the cooling field, but that after seeing the equipment offered and talking with the heating people who have been making installations, he had completed arrangements with a manufacturer to handle the complete line and was looking forward to the spring and summer when he could go out and tell his customers about the benefits of year 'round air conditioning.

The show not only exhibited heating and cooling equipment, but just about every type of auxiliary was displayed and demonstrated by the booth attendants. Control systems with all of their component parts and possible applications offered some new and interesting challenges to the dealer who wishes to provide complete automatic operation for his customers.

Among the other displays could be found many new items being introduced for the first time — among them air filters, humidifiers, diffusers, dampers, safety appliances, bending brakes and combination shop tools . . . . . all being shown for the benefit of the dealer who is looking for a better way to serve his community.

The staff of American Artisan has known for a long time that the warm air heating dealer is the logical man to install the cooling equipment in a residence, and last August embarked upon a series of articles dealing with the adaptation of summer cooling equipment to existing warm air systems. All issues since then — and many more to come — have been planned to cover pertinent phases of the subject of cooling. This month we are covering, in one article, the condensing unit and how it performs the functions of returning vaporized refrigerant back to a liquid. For details of what has already been covered and what will follow in the months ahead, turn to the next page.

As We Go To Press . . .

THE ANNUAL meeting of the American Society of Heating and Ventilating Engineers and the International Heating, Ventilating and Air Conditioning Exposition are being held in Chicago. These big events were "previewed" in the January American Artisan. The papers presented at the technical sessions that are of interest to members of our field will be published in forthcoming issues of American Artisan. Many of the new products displayed at the Show will be described in our Equipment Developments department.

Air Conditioning Fundamentals

This is the sixth in a planned series of articles intended to give readers of American Artisan grounding in the fundamentals of air conditioning systems for summer and winter, and to provide specific information on all the component parts. Special emphasis is placed on how to adapt cooling to warm air heating systems.

Articles So Far Have Covered:

1. The terms used in the air conditioning field, i.e., air properties, comfort conditions, etc. (September issue)
2. The parts of the refrigeration system and how they work (October issue)
3. How to estimate cooling loads (November issue)
4. How to achieve proper air stream patterns in the conditioned space (December issue)
5. Duct design — comparison between sizing for summer and winter (January issue)
6. Condensing units (this issue)

Future Articles Will Treat:

1. Fans (also motors and fan speeds)
2. Filters — throwaway, cleanable, electronic
3. Cooling towers (also water valves)
4. Equipment selection
5. Electrical control systems
6. Electric controls
7. Sample problem — estimating cooling load and selecting equipment
8. Second sample problem, using different building and conditions
9. Trouble shooting — detecting malfunctioning of summer air conditioning equipment (two articles)
10. Replacement procedures for defective parts in cooling equipment (two articles)

About the Condensing Unit . . .

what it consists of, how its capacity is established, and how this capacity is balanced against an evaporator to achieve the desired amount of cooling at a certain level

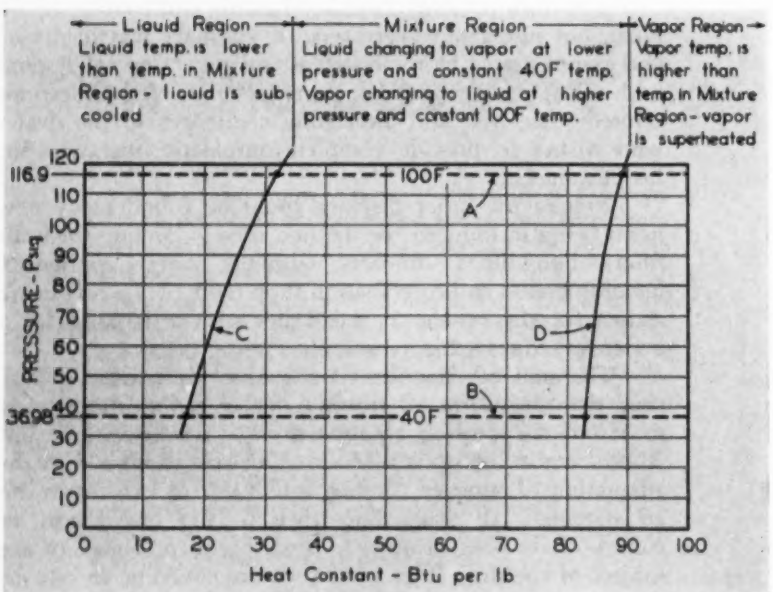


FIG. 1—CHARACTERISTICS OF "Freon-12" refrigerant at temperatures and pressures used for air conditioning systems. Line C is the saturated liquid line curve and line D is the saturated vapor curve

MECHANICAL COOLING is achieved by making use of certain substances which have an ability to change state, that is, to change from a liquid form to a vapor form and back again. This was covered in some detail in an earlier article of this series (American Artisan, Oct. 1952) which compared the behavior of refrigerants, the substances used in mechanical cooling systems, to the behavior of a more generally familiar substance, water. It was shown that the temperature at which a refrigerant changes from its liquid state to its vapor state (the process known as boiling) and the amount of heat per lb needed to effect the change depend upon the pressure at which the process takes place.

Fig. 1 shows some of the characteristics of one of the more common refrigerants, known as "Freon-12" (F-12). Line A shows that under

a pressure of 116.9 psig (lb per sq in. gage) the refrigerant will change from a liquid to a vapor at a temperature of 100 F, if 57.46 Btu are added for each lb. Likewise, line B shows that under a pressure of 36.98 psig the refrigerant will change from a liquid to a vapor at a temperature of 40 F if 65.71 Btu are added for each lb. The boiling process is analogous to the state change of water. Under atmospheric pressure of 14.7 psig, water changes to vapor (steam) at a temperature of 212 F if 970.2 Btu are added for each lb. Lines A and B represent only two combinations of pressure, temperature, and heat at which F-12 can be made to change from liquid to vapor. Actually, the process can take place at an infinite number of combinations varying from pressures below atmospheric to pressures approaching 565 psig. Related to each pressure there is a specific temperature and amount of heat required to change liquid to vapor. The process is reversible in that vapor can be condensed to liquid by removal of the amount of heat associated with each temperature and pressure.

Lines C and D on Fig. 1 are known technically as the saturated liquid line and the saturated vapor line, respectively. Liquid refrigerant having a heat content value that puts it in the region to the left of line C is known as subcooled liquid. If it were in this region on line A, for instance, at a pressure of 116.9 psig, it would have a temperature less than 100 F. As heat is added, the temperature of the liquid would rise until line C was reached. At this point any further addition of heat would cause the liquid to change to vapor at the constant temperature of 100 F. When exactly enough heat had been added to boil off all the refrigerant to vapor, the state point would be at the intersection of lines A and D.

Any further addition of heat to the vapor would cause a rise in temperature of the vapor in the region to the right of line D, which is technically known as the superheated vapor region.

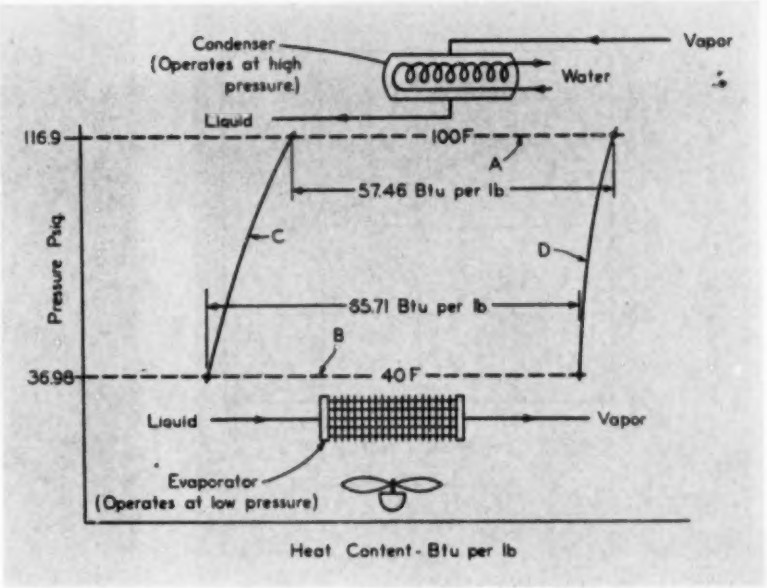


FIG. 2—THE HEAT CONTENT of the refrigerant varies with changes in the operating temperatures at the evaporator and the condenser

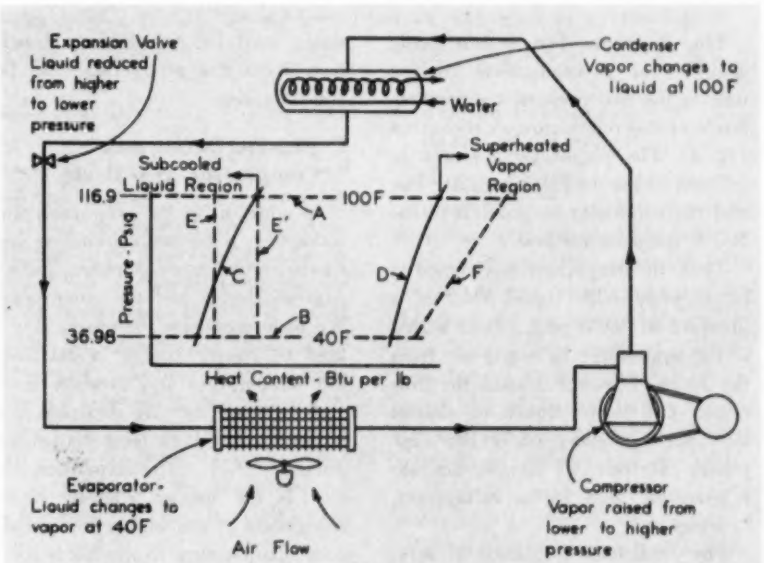


FIG. 3—BY SUBCOOLING the liquid refrigerant it is possible to increase the absorption of heat at the evaporator. This is demonstrated by comparing line E' with line E

Functions of Evaporator and Condenser

Air conditioning units are used essentially to transfer heat from spaces where it is not wanted for reasons of comfort to spaces or substances where high temperatures are of no concern. In a residence, for instance, heat is transferred from inside the home to water which goes down the sewer or to the atmosphere. Each air conditioner, therefore, has two places where heat transfer takes place, one where heat enters and one where heat leaves. The part of a unit where heat enters is known as the evaporator, and the part where heat leaves is the condenser.

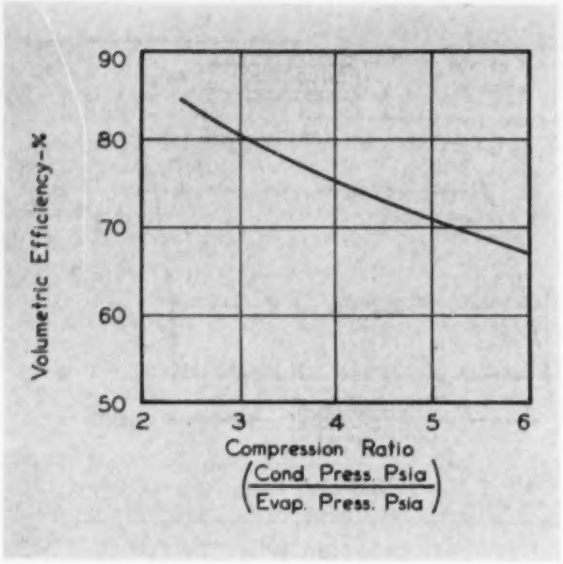


FIG. 4—AS THE COMPRESSION ratio is increased, the volumetric efficiency decreases to an unsatisfactory percentage

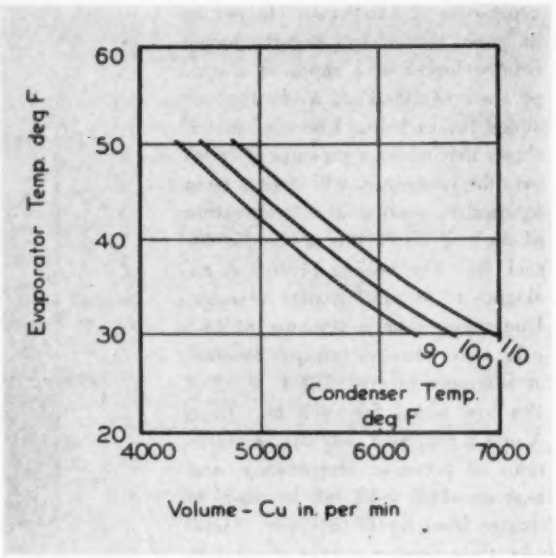


FIG. 5—EVAPORATOR AND CONDENSER temperatures are directly related to the volume of "Freon-12" vapor that must be handled by the compressor to produce the rated capacity required per ton of cooling

Fig. 2 relates two of the basic elements of a mechanical cooling unit to the two pressure-temperature levels of the refrigerant as shown on Fig. 1. The evaporator is shown in relation to the 40 F temperature line and the condenser in relation to the 100 F temperature line.

Thus, the evaporator is assumed to be supplied with liquid F-12 at a pressure of 36.98 psig. Heat added to the evaporator by warm air from the house blowing across the fins causes one lb of liquid to change to vapor for every 65.71 Btu supplied. The air, of course, because it gives up heat to the refrigerant, becomes cool.

The condenser is shown in relation to the 100 F temperature line and is assumed to be supplied with F-12 in vapor form at a pressure of 116.9 psig. The condenser can be either a finned coil like the evaporator or a shell and coil type unit as shown. In the former case, outside air is blown over the fins to remove the 57.46 Btu per lb needed to change or condense the vapor to liquid form again. In the case shown, cool water from either city water mains, well, or cooling tower is used to remove the necessary heat from the refrigerant. The air or water used for condensing absorbs heat from the refrigerant and becomes warm.

Expansion Device and Compressor Also Basic

In addition to the evaporator and condenser, a mechanical cooling unit has two other basic elements, the expansion device and the compressor. We have seen how the evaporator is used to absorb heat at a relatively low temperature and pressure level, and the condenser, to dissipate heat at a relatively high temperature and pressure level. The expansion device is the means whereby liquid refrigerant at the higher level is reduced in pressure to the lower level. The compressor is the means whereby vapor refrigerant at the lower level is raised in pressure to the higher level. The four elements of a mechanical cooling system working together permit cooling to be accomplished by the constant recirculation of refrigerant.

Fig. 3 shows how the expansion device and the compressor are related to the evaporator and condenser to make a complete mechanical cooling system. The compressor pulls low pressure vapor from the evaporator and raises its pressure. At the higher pressure, heat is removed from the vapor by water in the condenser, causing the vapor to change to liquid with no change in pressure. High pressure liquid leaves the condenser and passes through the expansion device (either a valve or a restrictor tube) which allows the pressure to drop to the desired lower pressure. Finally, the low pressure liquid enters the evaporator where it again changes to vapor by absorbing heat from the air. The cycle then repeats itself.

Circumscribed by the cooling system on Fig. 3 is shown the refrigerant diagram of Fig. 1 with the addition of three new lines, E, E′, and F, which represent the operation of the expansion device and the compressor. The process of reducing the pressure of the refrigerant from the 116.9 psig of line A to the 36.98 psig of line B can take place either along line E, where the high pressure liquid is to the left of line C and therefore in the subcooled region to start with, or along line E′, where the high pressure liquid is on the liquid saturation line. It is advantageous to have the process take place along line E, of course, since when the liquid is reduced in pressure to line B it will have less initial

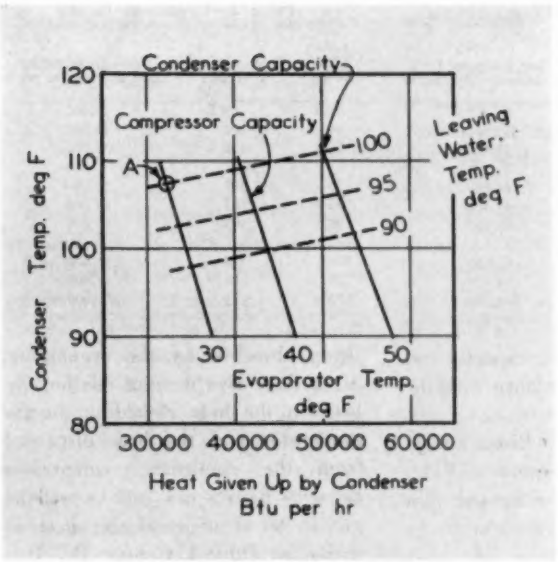


FIG. 6—THE CONDENSER and compressor ratings are cross plotted to determine the intersecting points, which are the balance points of the condensing unit

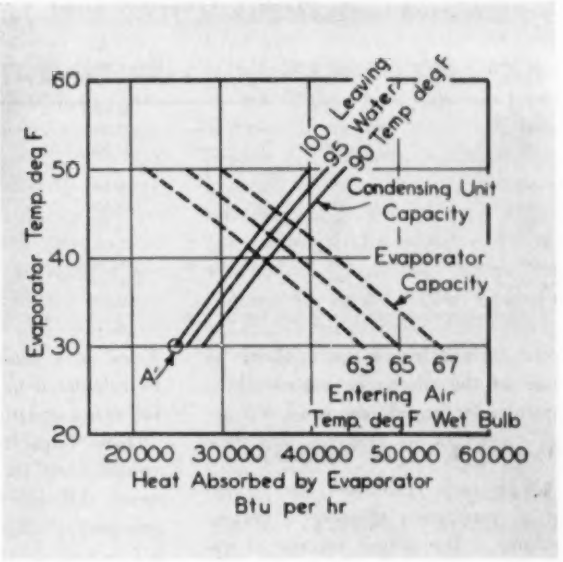


FIG. 7—THE BALANCE points of the evaporator and the condensing unit are represented by the intersections

heat and therefore can absorb more heat per lb than it will if it follows line E′ to the lower pressure.

In either case, some of the liquid will change to vapor in passing through the expansion device — more in the case of line E′. The intersection of line E with line A is determined by the amount of cooling done on the refrigerant after it becomes liquid in the condenser. On small units liquid cooling is done by soldering or taping part of the warm liquid line between the condenser and expansion device to part of the cool suction line between the evaporator and the compressor.

Compressor Operates in Superheat Region

Line F represents the operation of the compressor. It is to the right of line D and therefore entirely in the superheat region as explained with reference to Fig. 1. Mechanical cooling systems are usually adjusted so that refrigerant vapor leaves the evaporator in a slightly superheated condition, perhaps 10 F above the temperature at which the boiling process takes place (in this case 40 F). The actual point at which refrigerant leaves the evaporator lies on line B somewhere between lines D and F. Further heating is done on the vapor after it leaves the evaporator if the liquid and suction lines are taped together in order to subcool the liquid so that the vapor finally enters the compressor in a condition represented by the intersection of lines B and F.

The Btu heat content value of the refrigerant is increased by the compression process in the amount of energy put into it by the compressor. The condition of the refrigerant as it leaves the compressor is represented by the intersection of lines A and F.

The leaving point of the compressor is also the entrance point of the condenser. Superheated vapor as represented by the intersection of lines A and F is cooled in the condenser without any condensation taking place until it reaches line D. Further removal of heat causes the vapor to condense to liquid, which process is complete when heat, as represented by the distance between line D and C, is removed for every lb. The amount of heat removed from the refrigerant in the condenser equals the heat picked up in the evaporator plus the heat equivalent of the energy supplied by the compressor.

Operating Pressures Result of Balance

In the previous discussion concerning Fig. 1 certain operating pressures were assumed for both the evaporator and the condenser. In actual practice, these pressures are the result of a balance between the heat load being removed (as reflected by the temperature of air entering the unit), the water or air temperature available for condensing refrigerant, and the capacity of the mechanical cooling system. The method of predetermining the operating pressures of an air conditioning system will be covered in the discussion which follows.

The heart of the mechanical cooling system is the compressor. This is simply a gas pump. Most compressors of medium size such as are found in residential size air conditioners are of the reciprocating type; that is, they have a crankshaft, connecting rods, and pistons. As the crankshaft revolves the pistons move up and down in cylinders. Refrigerant vapor is drawn in through suction valves, usually in the cylinder head, from the evaporator, as the piston makes its down stroke. On the up stroke, the piston compresses the vapor and raises its pres-

Table 1—Compressor Rating

Evaporator Temp.	Condenser Temp.	A Heat absorbed by Evaporator — Btu per hr	B Heat dissipated by Condenser — Btu per hr
30 F	90 F	30,000	37,400
30	100	27,000	34,500
30	110	24,000	31,500
40	90	38,400	46,700
40	100	34,800	43,400
40	110	31,500	40,400
50	90	48,500	57,800
50	100	44,100	53,700
50	110	40,500	50,600

Table 2—Condenser Rating

Leaving Water Temp.	Refrigerant Temp.	Heat dissipated by Condenser — Btu per hr
90 F	98 F	35,000
90	100	45,000
90	102	55,000
95	103	35,000
95	105	45,000
95	107	55,000
100	108	35,000
100	110	45,000
100	112	55,000

sure until it leaves the cylinder by way of the discharge valves which are also in the cylinder head.

How Much Vapor Volume?

With each revolution the pistons of a compressor displace a certain volume. The actual volume of vapor the compressor can pump, however, is always less than the piston-swept volume, due to certain unavoidable losses: 1) superheating of entering vapor by warm cylinder walls causing increase in vapor volume; 2) friction loss through valves and ports causing lower cylinder pressure; 3) re-expansion of compressed vapor from clearance volume which reduces the amount of new vapor that can enter.

The actual volume of vapor that can be pumped divided by the piston-swept volume is known as the volumetric efficiency of the compressor. It is not a fixed value but varies with compression ratio (condenser pressure divided by the evaporator pressure in lb per sq in. absolute). The volumetric efficiency for a typical small compressor is shown on Fig. 4. It must be established by test. The compression ratio required for air conditioning with F-12 usually will fall between 2.5 and 3.

From tables of the properties of refrigerants which are available from refrigerant manufacturers it is possible to calculate how many cu in. of refrigerant vapor must be pumped per minute by the compressor to produce cooling at the rate of 12,000 Btu per hr (1 ton). This volume rate varies with the condenser and evaporator temperatures and can be plotted in curve form as shown on Fig. 5. Using values from Figs. 4 and 5, a compressor capacity can be calculated in accordance with the following equation.

Tons Capacity = [Piston swept volume (cu in. per min) x Volumetric Efficiency]/[Cu in. per min per ton]

Factors Reducing Compressor Capacity

A careful examination of Fig. 5 and the equation above shows that for a given evaporator temperature, a higher condenser temperature will require that a greater volume of refrigerant be pumped for each ton. Since a compressor has a fixed displacement (at a given speed) the effect of the higher condenser pressure will be a reduction in capacity.

Furthermore, for a given condenser temperature a lower evaporator temperature will also require a greater volume per ton and will result in a reduction in capacity. The rule of thumb is, therefore, that reduced compressor capacity results from either a raising of the condenser temperature or a lowering of the evaporator temperature or both. The reverse of this will, of course, raise compressor capacity.

Compressor horsepower is a function of compression ratio and compressor speed. Actual values are determined by test. For air conditioning work it is well to remember that it takes about one compressor horsepower for each ton (12,000 Btu per hr) of cooling.

Suppose we have used the preceding equation and Figs. 4 and 5 to calculate a compressor capacity for a number of operating temperatures as shown on Table 1, Column A. These capacity figures are in terms of the rate at which heat is being absorbed by the evaporator. Since there is a definite relationship between the heat picked up in the evaporator and the heat discarded from the condenser, compressor capacity figures can just as well be put in terms of condenser heat as shown on Table 1, Column B. This relationship can be worked out from the refrigerant property tables. The figures in column B were used to plot the solid lines on Fig. 6 which show compressor capacity in terms of the number of Btu per hr discarded by the condenser. The purpose of doing this is to enable us to cross plot directly a condenser capacity.

Condensers are simply heat exchangers. In the shell and coil water cooled type, refrigerant condenses at a constant temperature on the outside of tubes through which water flows. Water enters at a certain temperature, absorbs heat, rises in temperature and leaves. The leaving temperature is always less than the temperature of the condensing refrigerant. The flow of heat through the tubes depends, among other factors, on the temperature difference between the refrigerant and the water. The more heat to be removed (the greater the condenser loading) the greater must be the temperature difference for a given water flow. Condensers are usually rated in terms of loading *vs.* temperature difference between condensing refrigerant and leaving water temperature, as shown in Table 2. These figures were plotted on Fig. 6 as the dotted lines.

Find Balance Points of Condensing Unit

The reason for cross plotting the

Table 3—Evaporator Ratings

Entering Air Wet Bulb Temp.	Refrigerant Temp.	Heat absorbed by Evaporator — Btu per hr
63 F	30 F	46,000
63	40	34,500
63	50	21,000
65	30	50,000
65	40	38,500
65	50	26,000
67	30	54,500
67	40	42,500
67	50	29,800

condenser and compressor ratings is to determine the intersecting points which are the balance points of the condenser and compressor or, more simply, of the condensing unit. Values of condenser Btu per hr, evaporator temperature, condensing temperature and leaving water temperature are read at each intersection (see point A, Fig. 6). Condenser Btu per hr values are reduced to the corresponding evaporator Btu per hr values by the relationship calculated from refrigerant property tables, and then the intersecting points replotted as illustrated by point A′ on Fig. 7. This plot, shown in solid lines, is known as a condensing unit rating. Across this in dotted lines is plotted an evaporator rating.

An evaporator, like a condenser, is nothing but a heat exchanger. In the finned coil type used in air conditioners, warm air flows over finned tubes on the inside of which refrigerant is vaporizing at a constant temperature. Air, in giving up heat, drops in temperature, but the leaving air is always warmer than the temperature of the vaporizing refrigerant. As with condensers, evaporator capacities are a function of the temperature difference between the refrigerant and the air. Evaporator capacities for most air conditioner applications are given for various entering air wet bulb and refrigerant temperatures. Table 3 gives evaporator capacity figures which are also cross plotted on Fig. 7 as the dotted lines.

The intersections of the lines on Fig. 7 represent the balance points of the evaporator and the condensing unit. By means of Figs. 6 and 7 it is possible to take any reasonable combination of entering air and leaving water temperatures and determine the unit capacity and operating temperatures (and corresponding operating pressures). This procedure is used by engineers who design packaged air conditioners and also by field engineers who apply remote-type condensing units to evaporators built into ductwork.

Inspection of Fig. 7 will show that the same condensing unit (perhaps with a different motor size) can be balanced against almost any size of evaporator to produce cooling at lower or higher levels. A food freezer, for instance, would require a much lower evaporator temperature than an air conditioner. Therefore, an evaporator would be selected which, when plotted across the condensing unit, would intersect (balance) the condensing unit capacity at the lower temperatures.

Present day air conditioning contractors are no longer confronted with the problems of balancing the components for a packaged cooling system. This work has been done by the air conditioner manufacturers who have selected all the required components for the cooling system and built them into attractive cabinets for convenience in selling and handling. The contractor who deals with factory-engineered and assembled equipment, however, should not close his eyes to some of the basic facts about the product he sells.

Don't Oversize the Furnace, Says NWAHACA

A BULLETIN recently issued by the National Warm Air Heating and Air Conditioning Association, which is intended for distribution to home owners, stresses the importance of correct furnace sizing for the best home heating results. It points out that in past years, it was considered good practice to install a furnace "plenty big enough" in order to make up for any deficiencies in the design of the heating system or heat leaks in the building. The oversized heater was intended to supply "extra power" to keep the building warm.

However, the bulletin goes on to explain that research by the warm air heating industry as well as the association has proved this theory to be wrong. An oversized heating unit wastes fuel; an undersized one will not stand up under the constant high temperature heating demands made of it. For efficiency, economy and comfort, the heating system must be accurately sized, properly designed, and correctly installed.

The bulletin explains to the home owner that the basic requirement for the determination of the correct size of the warm air furnace and the heat distribution system is an accurate determination of the heat loss of the structure.

Home owners should realize, the bulletin points out, that the heating job of the system is to put heat in a house at the same rate at which it is lost to the outside through the walls, glass, and around doors and windows.

Home owners are told, "Beware of the heating man who comes into your home to make estimates for your furnace installation, and who merely glances around the house and quotes you a price. To insure that every room in the house will be correctly heated, it is necessary to carefully measure each room, window and door and make proper allowances for the type of construction. Today's heating standards are based on engineering science and 'rule of thumb' estimating will generally give the home owner disappointing heating results."

The prospective furnace buyer is urged in the bulletin to specify that his system be sized in accordance with *Manual 3 — How to Figure Heat Losses*, published by the association.

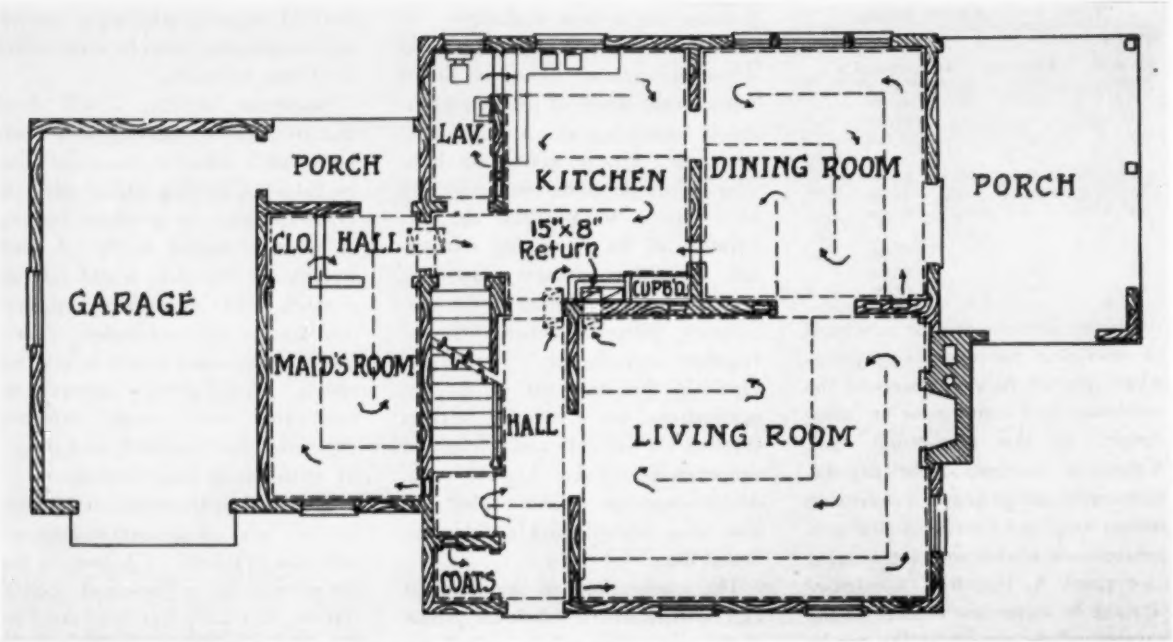


FIG. 1 — PANEL HEATING STUDIES were conducted in this Utica, N.Y., residence. In this system, the air followed a completely closed circuit, from heater to ceiling panel and back again. Arrows indicate how air was guided through passes over the ceiling

Heating Homes with Warm Air Ceiling Panels

Research has indicated some interesting differences between ceiling panel systems and conventional high wall register systems, and has pointed up the remarkable influence of sub-floor temperatures on the temperature gradients in the living zone

R. W. Roose and S. Konzo
University of Illinois

THE CEILING panel system cannot be overlooked in any survey of the development of warm air heating. The applications described in this article were not made in basementless houses, but ceiling panel systems in general are considered applicable to houses with and without basements.

One of the most significant developments in the post-war heating market was the use of panel heating, both in the floor and in the ceiling. The developments in panel heating blossomed first in the hot water heating industry, and both ceiling and floor panels were utilized.

Three inherent limitations of the floor panel system became apparent with usage, and these limitations existed regardless of whether the floor was heated by means of hot water coils embedded in the concrete floor slab or by means of warm air ducts placed below the slab.

First, the floor surface temperature in the living areas should not be so warm that the occupants can get a "hot-foot". No definite temperature limits have been defined, but commonly accepted maximum values are about 85 F for main floor areas and between 100 F and 120 F for borders of rooms, aisles, and other floor surfaces where the occupant will not be exposed for long periods.

Second, the heat-emitting rate of the floor surface depends upon the floor surface temperature. For ex-

ample, if the maximum floor surface temperature is limited to 85 F, then the maximum heat output is approximately 35 to 40 Btu per hr per sq ft of floor area. This is a relatively low rate of heat emission, and requires that the structure should be weatherproofed completely, so that the design heat loss does not exceed 35 to 40 Btu per hr per sq ft of floor area. For a structure having 1000 sq ft of floor area, for example, the weatherproofing should be complete enough to provide a design heat loss not in excess of about 40,000 Btu per hr.

Third, the mass of concrete in the floor slab when once heated is slow to cool; and when cooled is slow to heat. In general, heat storage effects do give a so-called "flywheel" effect and serve to maintain uniform temperatures in the rooms during constant cold weather conditions. This heat storage effect, however, can prove annoying to the occupant during periods when the weather is changing rapidly, or when sun effects cause sudden increases in room-air temperatures.

Arguments Given for Ceiling Panel Systems

In spite of these limitations, however, floor panel heating was extensively used in the two or three years following the war, particularly with hot water coils embedded in the floor slab. Another segment of the hot water heating industry was just as eagerly pushing the merits of ceiling panel systems. The arguments which were put forth by these advocates were: maximum ceiling surface temperatures are of the order of 120 F and not 85 F; the heat emission rate of such a ceiling surface is greater than that from a floor panel; heat storage effects are smaller with a plaster ceiling than with a concrete floor slab; and a larger portion of the heat emitted from the surface is by radiation and not convection heating.

At any rate, by the time that the warm air heating industry was ready to consider other than conventional approaches to the heating of base-

DEVELOPMENT OF WARM AIR PERIMETER HEATING

This is the second of a series of articles showing a detailed development of the warm air perimeter type of heating system. In this series some of the published technical data resulting from investigations conducted at the University of Illinois in the Warm Air Heating Research Residences will be interpreted for the heating contractor. This research work has been sponsored by the National Warm Air Heating and Air Conditioning Association and is directed by the Research Advisory Committee of that body. In addition, some extracts will be made from the design and installation codes and manuals developed by the Installation Codes and Technical Education Committee of the Association.

Articles So Far Have Covered:

1. **Heating basementless homes (January issue)**
2. **Warm air ceiling panels (this issue)**

Future Articles Will Treat:

1. **Heating in slab floor homes**
2. **Survey of field practices**
3. **Early practices in perimeter heating**
4. **New research residence built**
5. **Comparison of two-loop perimeter system and three convection systems**
6. **Comparison of perimeter loop system and two-loop system**
7. **Perimeter laboratory studies**
8. **Crawl space heating studies**
9. **8 in. loop system *vs.* 6 in. loop system**
10. **Loop *vs.* radial system**

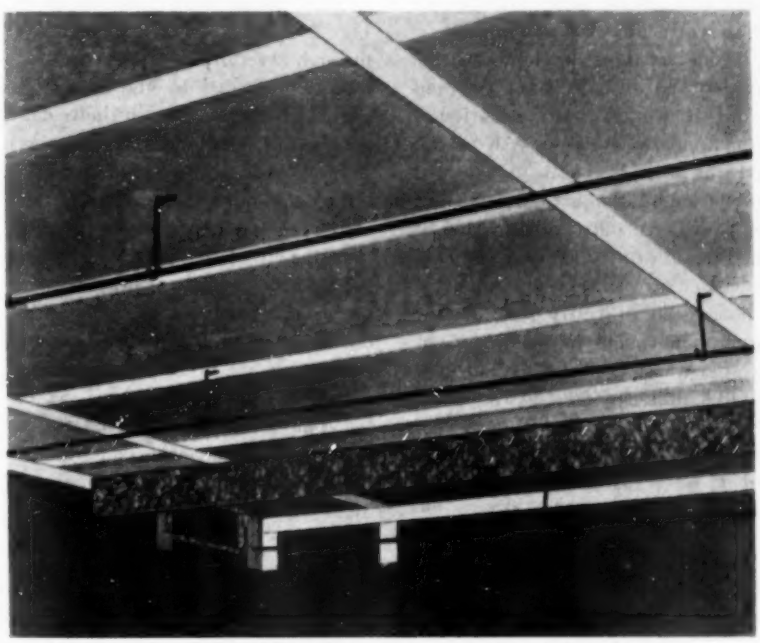


FIG. 2 — VIEW OF CEILING in the Utica residence before placement of the dropped ceiling. The sheet metal baffles shown were used to guide the air through several passes over the ceiling

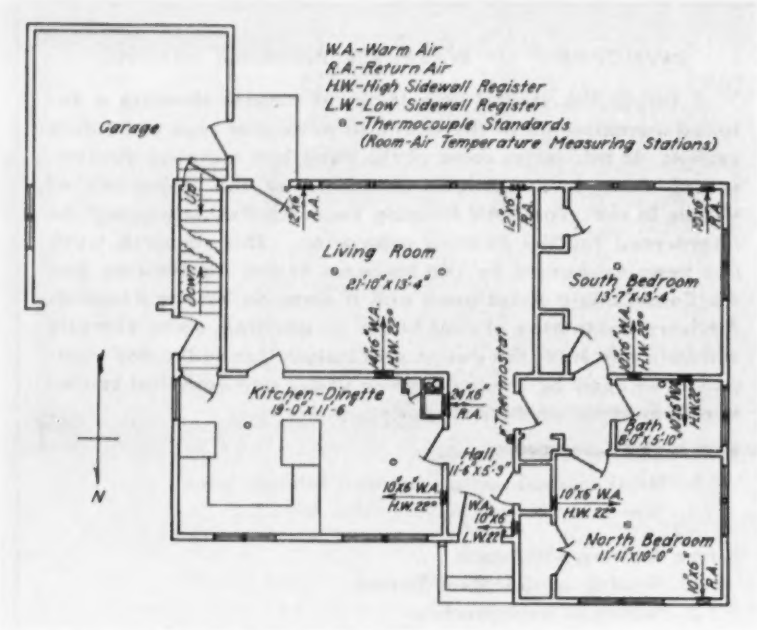


FIG. 3 — THE FIRST STORY PLAN of Research Residence No. 2 at the University of Illinois shows register locations for the convection system

mentless homes, it became clearly evident that panel heating was here to stay and that the demands of builders and architects for something new could not be ignored. In various sections of the country, almost simultaneous developments of floor panel and ceiling panel systems utilizing warm air were announced.

In most of these developments, the systems were installed on a "try and see if it works" basis. Curiously enough, many of these systems did perform fairly well. In this rash of developments, the activities of one company were outstanding. One of the first efforts to secure test data under actual operating conditions in a house and to verify some of the assumptions made in the design of the system were reported by a furnace manufacturer in New York state. (*Performance of a Residential Panel Heating System*, by H. F. Randolph and J. B. Wallace, ASHVE Trans., 1943, Vol. 49, pp. 235-253).

Warm Air Ceiling Panel Studies Made

The warm air ceiling panel system shown in Fig. 1 was installed in a test residence having a full basement, at Utica, N.Y. In this installation, the circulating warm air was not introduced into the rooms, and the circulating air followed a completely closed circuit, from heater to ceiling panel and back to the heater again. The panel consisted of a dropped ceiling under the existing ceiling.

Sheet metal baffles, as shown in Fig. 2, were used to guide the air through several passes over the ceiling, as indicated by the arrows in Fig. 1. In general, an individual panel was provided for each room, so that each ceiling panel received air of the same temperature at the start of the panel passageway.

As the circulating air traveled slowly in the shallow passageway between the dropped ceiling and the existing ceiling, heat was transmitted from the circulating air to the lower ceiling surface. The ceiling panel which faced the room gave off about 70 per cent of its total heat emission by means of radiation and the remainder by means of convection.

The results obtained with this closed panel system were most encouraging, and led to a demand for confirmation of the results and for a comparison of the results with a conventional warm air system in a house provided with a full basement.

In the meantime, Manual 7-A, *Code and Manual for the Design and Installation of Warm-Air Ceiling Panel Systems*, was issued by the National Warm Air Heating and Air Conditioning Association.

Ceiling Heating Investigated in Research Residence No. 2

The first series of investigations conducted in Warm Air Heating Research Residence No. 2 at the University of Illinois was devoted to a comparison study of a ceiling panel system and a conventional high wall register system. The Residence was built along lines of typical post-war construction. The floor area was about 1000 sq ft and a full basement was provided. Fig. 3 shows the first-story plan together with the register locations of the high-wall register system. For the sake of simplicity this conventional high wall register system has been designated as the "convection" system.

The Residence was well constructed and weatherproofed with both sidewall and ceiling insulation in use. Storm sash and storm doors were also provided, so that the design heat loss of the heated space above the first floor was only about 31,000 Btu per hr. This amounted to 31 Btu per hr per sq ft of floor area. The design heat loss of the basement space was about 21,000 Btu per hr.

The ceiling panel system utilized the 8 in. deep air space provided by the open web steel joists used in the ceiling. The lower panel surface, or ceiling of the first story rooms, was constructed of pressed cement-asbestos panels. The upper surface of the panel space consisted of ½ in. gypsum sheets, above which was placed a 3½ in. thickness of batt-type insulation in order to minimize the heat loss from the panel space to the attic. The ceiling panel arrangement and the duct arrangement in the attic are shown in Fig. 4, together with details of the panel construction.

Both the panel system and the convection system were connected to the same furnace, located in the basement, and were operated alternately throughout the heating season in or-

der to obtain performances of each system over a wide range of weather conditions. During the first season, studies were made of both systems with heat introduced into the basement. During the second season however, the studies were made with no heat introduced into the basement. The complete technical report has been published as University of Illinois Engineering Experiment Station Bulletin No. 401, *Comparative Performances of a Warm-Air Ceiling Panel System and a Convection System*, by R. W. Roose, M. E. Childs, G. H. Green, and S. Konzo. In the present article only a few significant items relating to comfort performance will be summarized.

Study Variations in Room Air (Heated Basement)

The temperatures for the convection system are shown in Figs. 5a and 5b, while those for the panel system are shown in Figs. 5c and 5d. The air temperatures at the ceiling level for the convection system varied from 80 F to 85 F, whereas in the panel system the variations were negligible. However, the fluctuations of air temperatures within the panel space were considerable. In the case of the panel system, therefore, the material in the ceiling produced a temperature stabilizing effect so that the air temperatures below the ceiling remained practically constant.

With the exception of the ceiling air temperatures, however, the air temperatures in the lower parts of the room were essentially unchanging for both systems. The variations were of the order of only 0.5 F during one complete cycle of burner observations.

From these observations it was concluded that the conventional room thermostat responded well for both the panel and convection systems. Furthermore, the rate of response of the thermostat was sufficient to follow normal changes in outdoor temperatures. Even with much more rapid changes in outdoor temperatures, no evidence of thermal lag or overheating of the rooms was observed with the ceiling panel system used.

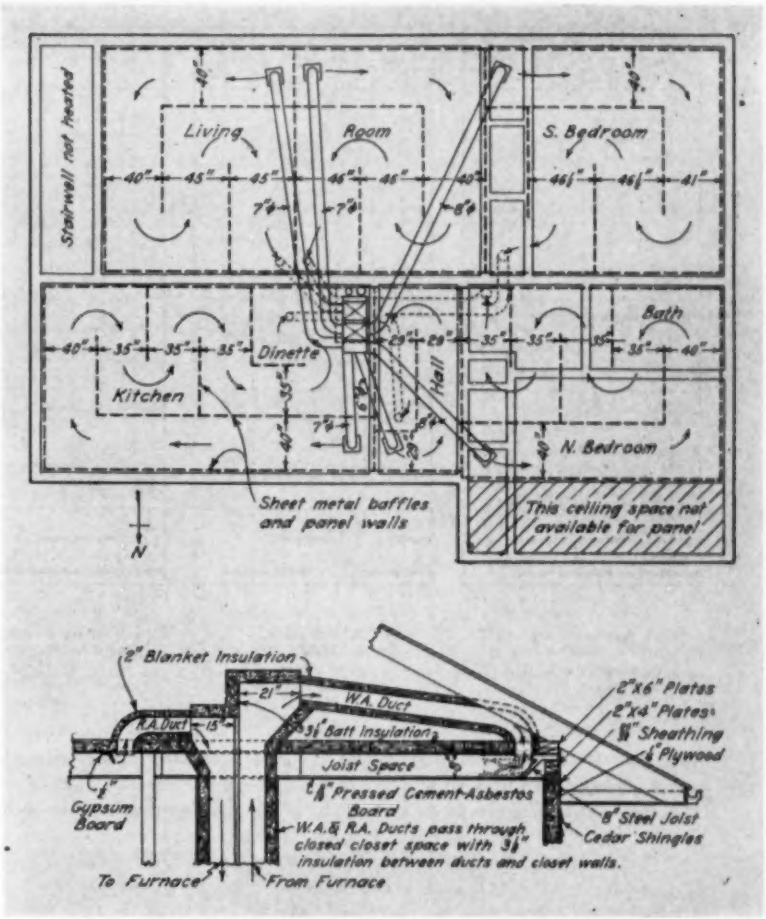


FIG. 4 — THE CEILING PANEL arrangement in Research Residence No. 2 *(above)* and the duct arrangement in the attic *(below)* are shown, together with details of the supply and return ducts

Observe Living Room Temperature (Heated Basement)

Observations were made in the living room of room-air temperatures in two horizontal planes. Fig. 6a shows the temperature contours for the convection system and Fig. 6b shows those for the panel system. The solid lines represent lines of equal air temperatures. The living room was selected for the study because the large amount of glass area should have resulted in relatively large differences in temperatures in the horizontal plane. The studies shown in Fig. 6 were based upon temperature measurements at 69 different locations in the living room, at both the sitting level (30 in. above the floor) and the floor level. The maximum range of differences in temperatures can be summarized as follows:

	Convection System	Panel System
Temperature range at Sitting Level	72.0-73.3 F	71.2-73.3 F
Temperature range at Floor Level	68.8-72.6 F	68.5-72.7 F

The difference between the two systems was small.

Compare Room-Air Gradients (Heated Basement)

The room thermostat setting was maintained at 72 F during all of these studies. However, as may be seen from Fig. 7, the average room-air temperatures were almost 1 F lower for the panel system than for the convection system. This difference was found to exist throughout the entire season, but was not noticeable as far as comfort sensations of the occupants were concerned. Apparently with the panel system, the thermostat was influenced by radiation from the ceiling panel, causing the thermostat

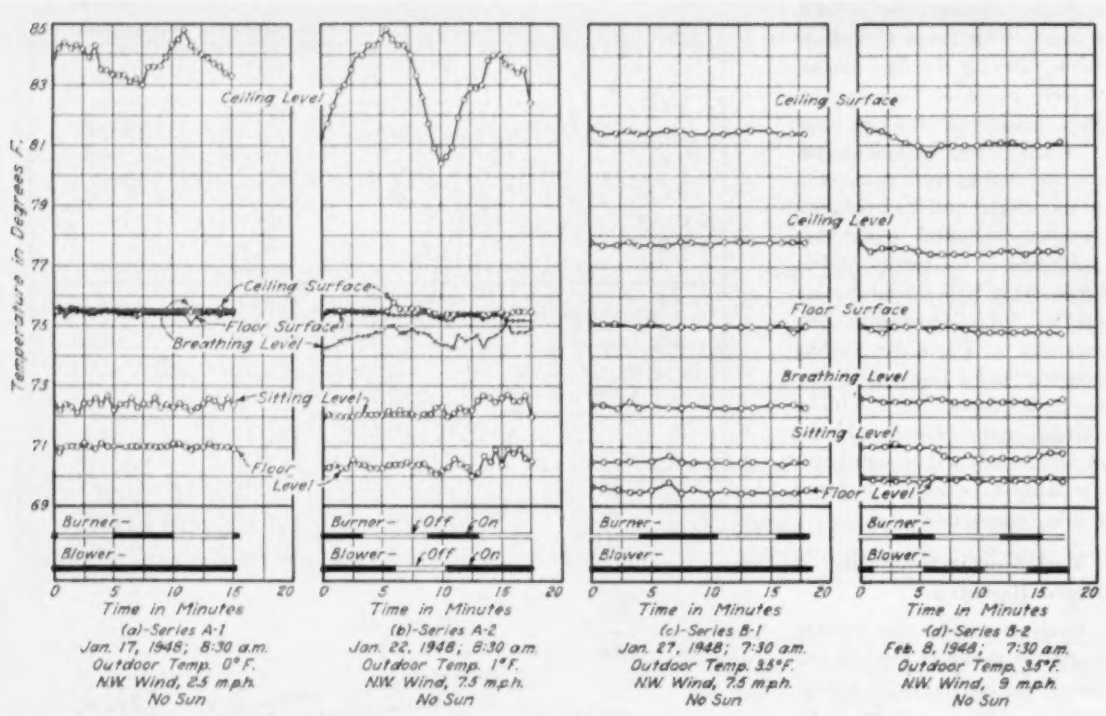


FIG. 5 — IN THE SOUTH BEDROOM, the air temperatures at the ceiling level for the convection system *(a and b above)* varied from 80 to 85 F, while in the panel system *(c and d above)* variations were negligible. However, air temperatures in the lower parts of the room were essentially unchanging for both systems

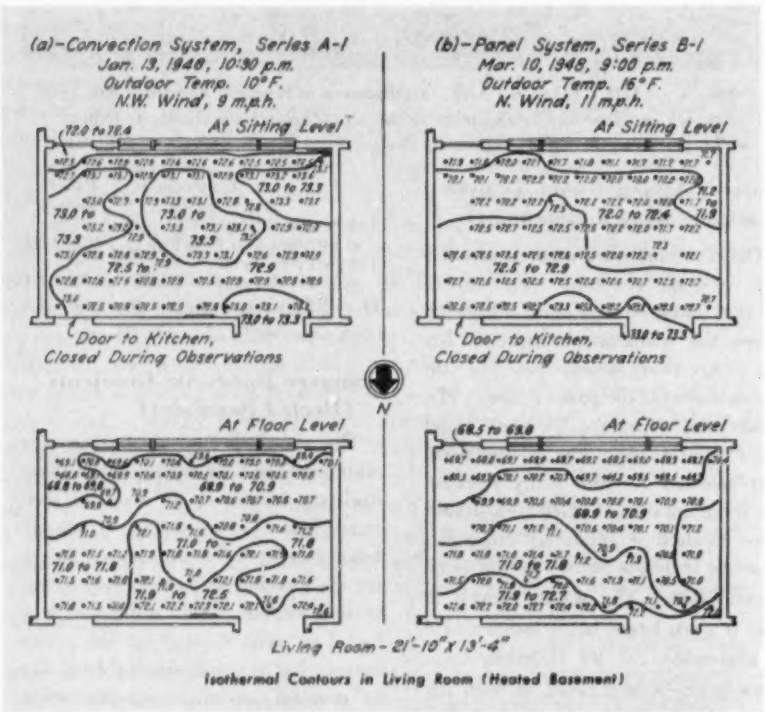

(a)-Convection System, Series A-1
Jan. 13, 1948, 10:90 p.m.
Outdoor Temp. 10° F.
N.W. Wind, 9 m.p.h.
(b)-Panel System, Series B-1
Mar. 10, 1948, 9:00 p.m.
Outdoor Temp. 16° F.
N. Wind, 11 m.p.h.
At Sitting Level
At Floor Level
Door to Kitchen,
Closed During Observations
N
Living Room - 21'-10" X 13'-4"
Isothermal Contours in Living Room (Heated Basement)

FIG. 6 — OBSERVATIONS WERE MADE in the living room (with heated basement) of room-air temperatures in two horizontal planes (floor and sitting level). The solid lines represent lines of equal air temperatures for the convection system *(a above)* and the panel system *(b)*

to be satisfied before the air temperatures reached the same value as those maintained with the convection system.

With both systems, the floor surface temperatures were greater than the air temperatures at the floor level. These higher floor surface temperatures were undoubtedly caused by heat transfer through the floor from the heated air immediately below the floor and to some extent by radiation from the warm ceiling surfaces.

In general, slightly better uniformity of air temperatures was maintained in the living zone by the panel system than with the convection system.

Record Living Room Temperature (Unheated Basement)

During the second series of studies no heat was introduced into the basement, with the exception of that from the furnace casing, bonnet, ducts, and flue pipe. The room-air temperatures measured in two planes in the living room are shown in Fig. 8 and sum-

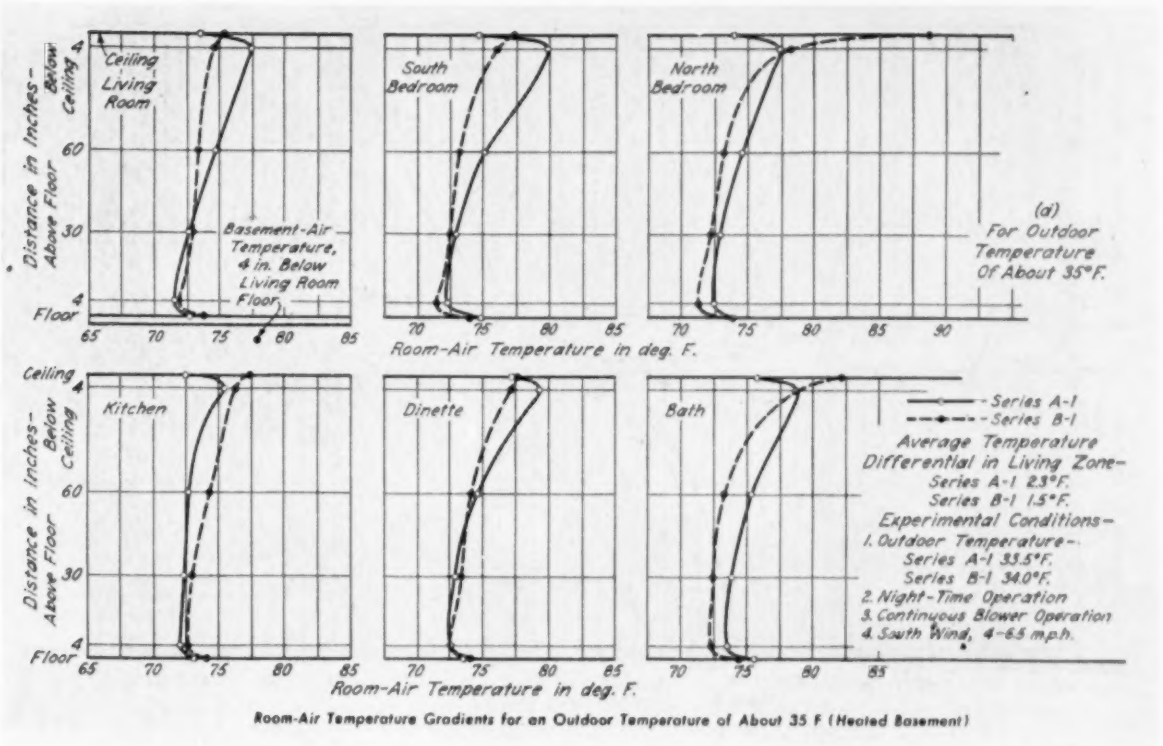


FIG. 7 — THE AVERAGE room-air temperatures (with heated basement and outdoor temperature of 35 F) were almost 1 F lower for the panel system than for the convection system

marized as follows:

	Convection System	Panel System
Temperature range at Sitting Level	69.4-71.6 F	69.1-70.9 F
Temperature range at Floor Level	65.9-69.0 F	65.3-69.0 F

Again, the difference between the two systems was small. Comparing the results with those from Fig. 6, the heated basement provided warmer conditions in the living zone than when no heat was added to the basement. It should be emphasized that the setting of the room thermostat was unchanged for all of these series of studies.

Compare Room-Air Gradients (Unheated Basement)

The effect that the unheated basement conditions had upon the room-air temperature gradients is shown in Fig. 9. In general, the uniformity of air temperatures in the living zone was better for the panel system than for the convection system. Also, although the thermostat setting was the same for the two systems, slightly lower room-air temperatures were maintained with the panel system.

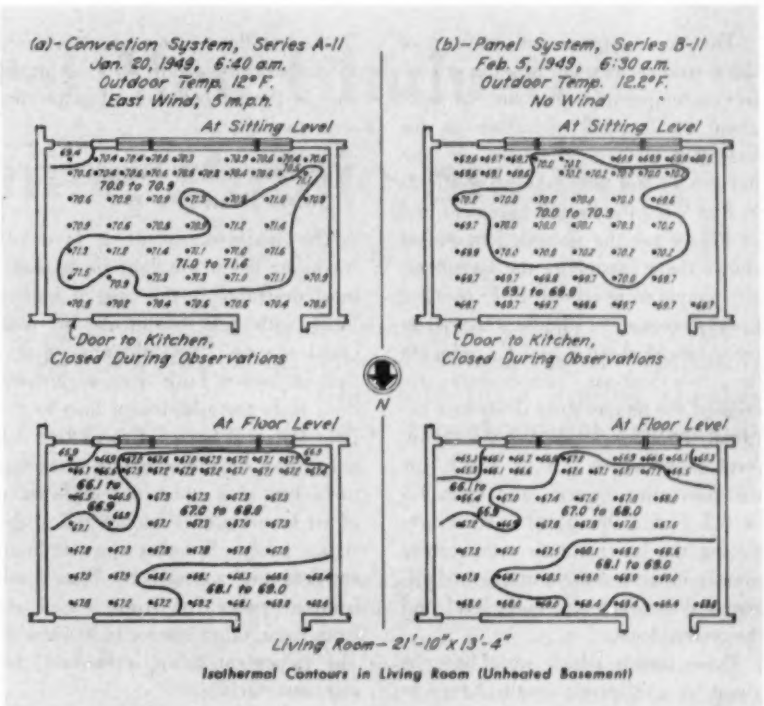


FIG. 8 — ISOTHERMAL CONTOURS in the living room were studied (with unheated basement), and the results are shown for the convection system *(a)* and the panel system *(b)*

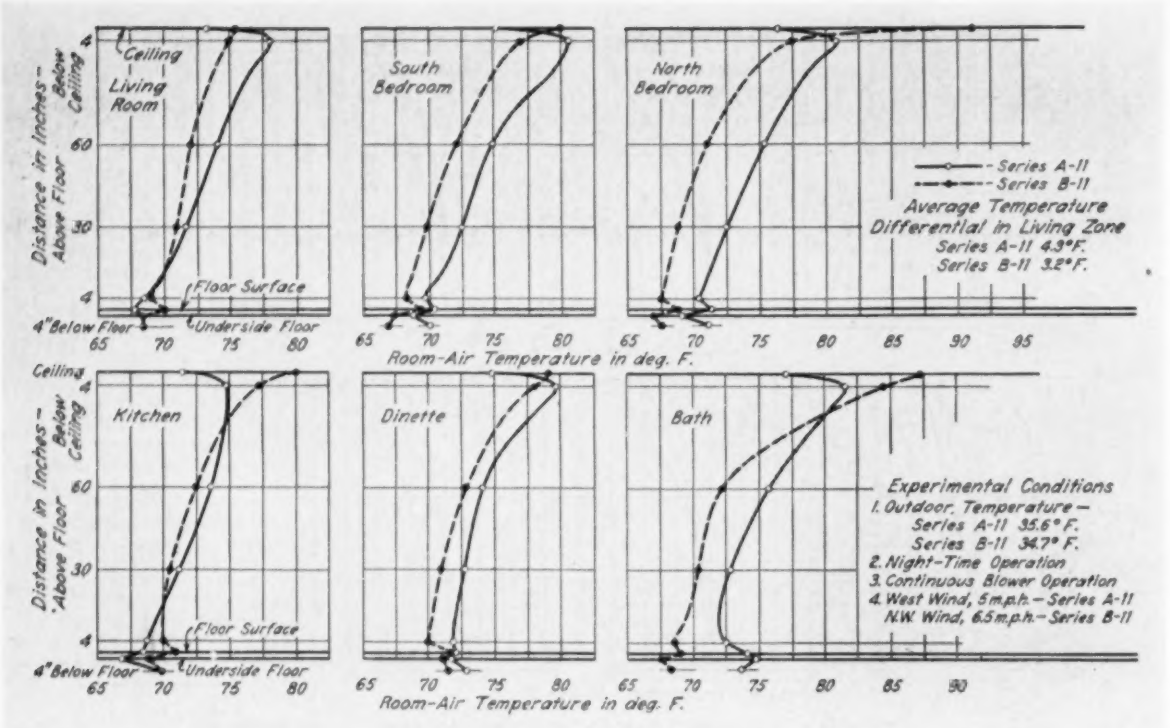


FIG. 9 — ROOM-AIR temperature gradients for an outdoor temperature of 35 F (unheated basement) showed greater uniformity in the living zone for the panel system than for the convection system

The most significant feature of these studies was the pronounced effect on temperature gradients brought about by a small reduction in the basement air temperatures. A comparison of the temperature gradients in Fig. 7 for the heated basement and in Fig. 9 for the unheated basement shows that: reducing the basement-air temperature about 8 F resulted in a decrease in floor-surface temperatures of about 3 to 4 F; reducing the basement-air temperature increased the temperature difference between the floor level and the 60 in. level from about 2.5 to 4.0 F for the convection system, and from 1.5 to 3.5 F for the panel system; reducing the basement-air temperature greatly increased the temperature differential between the floor level and the ceiling level.

These trends which were brought about by a relatively small change in basement-air temperatures were most important, and indicated that excessively large temperature differentials and cold floor surfaces would result if the sub-floor space is maintained at temperatures below 60 F, as in the case of the unheated crawl-space construction.

Warm Air Below Floor Joists Desirable

The maintenance of a layer of warm air below the floor joists seems most desirable in the case of houses built with full basements or with crawl spaces. It would appear also that in houses built over a concrete floor slab, the addition of heat to the floor slab will have a direct effect not only upon the floor-surface temperatures but also upon the uniformity of air temperatures maintained in the living zone. Whether the sub-floor surfaces are warmed by heated air from a register or from heated air from some other source is incidental. The important thing is to heat the sub-floor surface.

In this connection, the so-called heat loss from furnace casing, furnace bonnet, and ducts located in the basement cannot be considered as true losses. Any heat regain from such sources provides a floor-panel effect and thereby affects the comfort conditions in the rooms above the heating plant. These studies, therefore, although they did not particularly favor the ceiling panel system, did yield a most significant clue that was of great value in indicating the trend that warm-air heating developments should take. This is often the case in research. The by-product of research, in this case the remarkable influence of the sub-floor temperatures on gradients, is often as important as the end product originally sought.

In the next article in this series, a further development of the story of modern warm air heating will be unfolded.

[Figs. 1 and 2 were reproduced from *Manual 7-A, Code and Manual for the Design and Installation of Warm-Air Ceiling Panel Systems*, National Warm Air Heating and Air Conditioning Association, 3rd ed., 1950. Figs. 3 through 9 were reproduced from the University of Illinois Engineering Experiment Station Bulletin No. 401.]

OFFICERS OF the Sheet Metal and Roofing Contractors Association of Minnesota for 1953 are: *(seated l. to r.)* R. E. Walsh, president; H. T. Helle, president ex-officio; Ray Kraus, vice president; and Arlowe Esau, secretary; *(standing l. to r.)* Roy Dose, Willard Ahrens, and Morgan Nelson, directors for two years; A. O. Lassila, treasurer; and Fred Kuettel, sergeant-at-arms

"Boost Sheet Metal Industry By Winning Public Support"

. . . members of the Sheet Metal and Roofing Contractors' Association of Minnesota were told by a leading speaker at their recent annual convention

RECENTLY THE Federal Government, through its Justice Department, acted to indict trade associations on charges of restricting trade and setting prices. This action has been brought about by two main factors: 1) increased complaints by the buying public; 2) failure of the trade associations to conduct a good public relations campaign, according to D. M. Gephart, secretary-manager, St. Paul Chapter, National Electrical Contractors' Association.

The sheet metal and heating industries are specialty trades and should join together in a more active program to tell the buying public about the services being performed for them; the best way to achieve such a goal is through the local, state and national associations, he said in his address to the members of the Sheet Metal and Roofing Contractors' Association of Minnesota, assembled in St. Paul for their annual convention held January 8 to 10. Mr. Gephart went on to say that

the Justice Department is sincere in its belief that it is doing the right thing in accusing some trade groups of various forms of improper business conduct, including the forming of combines for stabilizing prices and limiting free trade.

Should Follow Lead of Other Industries

The sheet metal and heating industries should follow the lead of the automotive industry and the food processing groups which have carried their story to the public, according to Mr. Gephart. During the past year, the price of many automobiles was four times the cost of the same product in 1932, yet people do not complain that the 400 per cent increase is improper. They have been conditioned by good public relations to realize that they are really getting extra value for the increase. They are told that four-wheel brakes are better and why they are better, that a 120 hp engine is superior to the 40 hp engine of 1932 and that the car is safer now because of its lower center of gravity. Every year the public hears all about these advantages of the new model automobile.

But people hear little about the heating and sheet metal field, Mr. Gephart said. So they think an increase in the price they pay merely means more profit for the contractor, and they resent it. When they pay their bills — which they feel are too high anyway — and then fail to get satisfaction from the equipment, they go to the Government with complaints about how they have been victimized.

Must Carry Message on Nationwide Basis

The first step to reduce the complaints is to make sure that the public believes in the equipment it has purchased. The second step is to see that every installation is a good one.

The best way to impress the public is through the channels it has learned to believe in — news items — not just advertising. It must be done so that the point being made is reasonable and interesting. The contractor cannot do this in his own individual advertising because it becomes too expensive and has to be done on a national basis. This can be done only through a national association where the dues paid by many members help to defray the costs.

This is being done this year by the National Electrical Contractors' Association, where $150,000 is being contributed by the national association and another $150,000 is being added by local and state chapters. The $300,000 is going to be spent for informative facts about what electrical contractors are doing to bring better, safer and more adequate wiring systems to the public at a cost closely paralleling the prices paid for early wiring jobs. This program for a better understanding between the buying public and the contractor will be carried in such nationally known magazines as *Business Week*, *Fortune* and *The Saturday Evening Post*, and in this way the prestige of their industry will be increased.

IN LARGE PART responsible for the success of the convention were *(l. to r.)* Joseph Bartl and Richard E. Walsh, co-chairmen of the convention committee

Making Every Installation a Good One

To achieve the second step — making every installation a good installation — is more difficult than it seems because there are many factors that enter into this resolution. First, every good contractor must do his best to reduce the number of dissatisfied customers he encounters. Second, the "price cutter" must go. He is the one responsible for most of the complaints reaching the Justice Department. Third, we must educate our employees, both old and new.

Each of these subjects needs further elaboration to point out the paths that will aid the contractor and his association to gain their rightful place among the leading industries in today's business world. How can the contractor reduce complaints? By being as careful as possible when he submits his proposal sheet, seeing that everything needed for the job is included in the proposal, checking the job carefully before it is released to the purchaser, instructing the person responsible for the equipment's operation and making a practice of checking back a week or two after the job has been finished. The byword for these suggestions could very well be, "Build good will".

The "price cutter" is a different problem. He must go, and the best way to get rid of him is to operate your business in such an efficient manner that he cannot cut his price below yours. The price cutter has no friends, he has no good will, no worthwhile sales representatives, no engineering, no reliable product and no guarantee. He has no method of determining his overhead and gets his work because of his low bid, a bid that he will make regardless of the narrow margin of profit, or for no profit at all.

ENJOYING THE cocktail party before dinner are: *(l. to r.)* Morgan Nelson, W. F. Ahrens, A. G. Ettel, and H. G. Ahrens

HELPING TO register John F. Gill, St. Paul, are: *(l. to r.)* Mrs. L. Polanck, Harry Quade, Jr., R. E. Walsh, John Walsh *(seated)* and H. T. Helle

Every contractor can relate numerous cases where a price cutter has hurt the warm air heating trade. A customer condemns the industry, not the individual. The first answer to the price cutter is a careful check on operating expenses. Know your overhead and make your bids accordingly. When the price cutter takes on too many jobs where he loses money, he will soon be out of business. No customer will leave a contractor who is serving him faithfully and is giving genuine satisfaction on every job.

Guided Instruction Needed

Another problem of major importance is the elimination of poor journeymen. Firing them doesn't eliminate them because they merely go to work for someone else in the same field. Thus, the answer to overcoming this problem from an industry point of view is to provide guided instruction.

Men are not trained on the job. Individually, the contractor cannot carry the expense of training men as they should be trained, but a national association through its local chapters can. The association can set up training facilities and the contractor can do his part by providing equipment to do the training with.

Poor journeymen are the product of the industry's lack of understanding of the cost involved. Take the waste that occurs when a man is only 10 per cent inefficient. At $2.50 per hour this means a waste of 25c each hour, $2.00 a day and $520.00 a year! This money could be used to far better advantage trying to reduce the ineffectiveness of the individual.

A poor journeyman is not necessarily a product of his own making. Remember that the rapid expansion of the industry during the war and the rush of meeting the emergency caused many important skills to go undeveloped. Now is the time to plan for the years ahead and what they will mean to the industry in good will.

Why Join an Association?

In the electrical field a recent national survey indicated that one out of three contractors belonged to the national association and some of the reasons why a contractor joined these associations came to light. The reasons given were in many cases far removed from an association's true objective. The general purpose of an association is to develop the potentials of the industry and to educate its members in the handling of the many complicated affairs prevalent in today's business.

One stumbling block that keeps many contractors out of an association is the annual dues. However, contractors should keep in mind that dues frequently are less than the amount of money spent on a three day fishing trip made to impress one individual who may or may not mean an order. The dues are not the only requirement for becoming a member of an association. A man must be willing to attend meetings and be interested in the work being done.

Rome wasn't built in a day, but public acceptance can be had and at a reasonable cost if the sheet metal and heating contractors get together and prove to the public that they are worthy of the trust placed in them.

Survey Average Overhead

To support Mr. Gephart's recommendations, T. F. Burniece, President Ex-Officio, and J. A. Livi, Surface Combustion Corp., presented the findings of a recent survey made to determine average overhead cost of a contractor doing business in Minnesota. The following items were listed and the percentage of cost to sales is shown under different annual volumes:

	Up to $50,000	$100,000 to 250,000	$500,000 and over
Interest	0.58	0.20	0.17
Housing	1.87	1.89	1.68
Administration and Sales	0.93	8.62	8.82
Office	0.64	2.41	1.88
Insurance and Taxes	1.40	2.25	1.77
Production	0.55	1.32	1.74
Delivery	2.76	1.20	1.59
Depreciation	1.79	1.19	0.96
Other	—	0.67	0.25
Total	10.52	19.75	18.86
Direct Labor Payroll	14.02	26.20	26.52
Material Used	58.98	39.40	42.50
Subcontracted Services	1.72	2.80	4.25
Net Profit before Taxes	14.96	11.85	8.07
	100.00	100.00	100.00
Percentage of Overhead to Labor	74.00	76.00	71.00

Reviews Perimeter Heating

The perimeter heating system was covered by Clarence L. Grandstaff, vice president, C. A. Olsen Mfg. Co., who gave a brief review of the development of perimeter heat-

ing and told the contractors that the small pipe system is not new, that about 20 years ago a number of such systems were installed in the Cincinnati area, some of which are still in use today and providing excellent heating.

He explained that at the time these systems were installed, there was no engineering data available and that they had to be installed with the hope that they would be satisfactory. This is not the case today, he said, because the NWAH&ACA's Manual 10 provides reliable data to aid the heating contractor with his layout.

One of the problems to be solved by the Small Pipe Committee before conventional equipment could be adapted to the small pipe system was the redesigning of the air distribution system so that the warm air could be delivered to the wall of the building (where 80 per cent of the heat loss occurs), the return air intake being placed near the ceiling. Mr. Grandstaff pointed out that there is no reason why this method of air distribution had not been used extensively in the past, except that the early gravity systems had set a pattern where short duct runs were used to supply the warm air to a room, with return air grilles being located under the windows where the coldest air tended to collect. This helped to set up the gravity circulating system, but once a blower was installed in a furnace, the mechanical means of moving air did away with the necessity to depend upon gravity to aid circulation.

When the return air intake is located near the center of the building and at or in the ceiling, the resistance to air flow on the return side of the system drops to about 0.03 to 0.05 in. water gage. This leaves a resistance of between 0.15 and 0.17 in. water gage for the supply side of the system, and this is adequate for most heating installations.

Take Steps Toward Standardization

Most manufacturers today are no longer calling the perimeter registers by that name. They are using the term "diffuser" because it more accurately describes the action that takes place when warm air is supplied at or near the floor level.

Mr. Grandstaff pointed out that the NWAH&ACA adopted the 4 in. round duct as a standard for its manual because it is a size that can be obtained by any contractor from any wholesaler. He said that 3½, 4, 4½ and 5 in. round duct can be used very satisfactorily for small pipe systems.

The proper installing and adjusting of controls is an important step in the small pipe system's installation. The blower should be slowed until it operates practically constantly at an outside temperature of 35 or 40 deg and the bonnet control should be set for 110 to 115 deg cut-in, with between 90 and 95 deg as the cut-out point.

Summer cooling is coming to the warm air heating dealer and he should be careful about attempting to use small pipe systems for this service as they are usually too small to provide adequate carrying capacity for the heat gain loads. Conventional duct systems are the recommendation for anyone contemplating the installation of cooling equipment either when the house is built or at a later date, according to Mr. Grandstaff.

EXPRESSING THE gaiety which prevailed at the cocktail party is Leo Nees *(right)*, taking tickets from R. J. Grant *(left)* and J. M. Walsh

Sheet Metal Men Should Retain Own Work

E. C. Winter, business agent for the Sheet Metal Workers' Local 76 of St. Paul, told the contractors that years ago the installing of steel decking had been awarded to the sheet metal workers, but in recent years the sheet metal contractor had failed to bid this type of work, and the steel erecting contractors were getting it and having the iron workers do the installing. He said that this practice of using iron workers was being stopped every time a job was found to be handled in this manner, but that the sheet metal contractor could claim his rightful place as the decking erector if he would send in all bids showing both the roof and the decking.

In the discussion that followed it was brought out that many contractors have not bid on this work because the steel erecting contractor was sending in bids on this work, and he was able to submit lower bids than the sheet metal contractor. The sheet metal man must ask from 3½ to 5½ cents per sq ft above the cost of the material to "break even", and should receive from 7 to 9 cents to be assured a profit. Mr. Winter pointed out that as a specialty contractor, the sheet metal man should join his efforts with those of the sheet metal workers' union to see that the present trend is stopped.

He said that three factors entered into the picture — the general contractor, the seller of the product and the unorganized shop that attempts to underbid everyone else. These people, he felt, are aiding the spread of this undesirable practice, and unless the sheet metal contractor follows through on the work being done by the Sheet Metal Contractors' National Association to educate the general contractor and the architect, the iron workers — who have never yet contested the decision of the judicial body in its assignment of this work — may ask that they be awarded this work.

Other work sometimes taken by other trades is the

installing of store fronts, gutters and downspouts, valleys and lockers. Steps are necessary to retain these awards within the sheet metal field. The international union is backing the Sheet Metal Contractors' National Association completely.

Plan to Correct "Bid Shopping"

Richard S. Felhaber, attorney for the SMCNA, told the contractors about the workings of the "Bid Depositary" plan being used in the Buffalo, N. Y., area and said that the majority of the contractors participating in this action are very pleased with the excellent results obtained. He said that the Department of Justice representatives in the Buffalo area have studied and approved the plan and do not consider it as restraining trade in any manner.

"Bid shopping" is an unfair trade practice and must be corrected, he said, and this is one of the primary purposes of the Bid Depositary plan. The plan calls for duplicate bids to be sent to the supervising office where they are compared with the bid being awarded by a general contractor. The plan calls for assessing fines against any contractor found guilty of making rebates or performing any work not contained in the bid price.

The advantages of such a plan include better acceptance of a contractor's reputation by those being served in a community, the general elevation of the educational level of the industry and increased confidence between labor and management.

Registration Act Would Establish Standards

Ray Kraus, chairman of the legislative committee, explained the proposed registration act which would require the contractors in smaller communities to register with the state and in this way help to establish minimum installation standards for warm air heating, ventilating and air conditioning. The contractors doing such work would have to file with a state board, appointed for this purpose, a performance bond and compliance certificates. The board would be empowered, after inspection, to either approve an installation or prohibit the use of installations found to be hazardous and to assess penalities for violations.

Mr. Kraus recommended that all out-of-town contractors contact their state government representatives while they were in St. Paul and ask that they back the bill when it is presented before the committee.

Throughout the three-day convention nine wholesalers displayed equipment of interest to the contractor in booths set up near the registration desk. This equipment ranged from a complete furnace to ducts and fittings, blowers, grilles, tools, gutter hooks and ventilators.

Ladies Go on "Wild Goose Chase"

One of the livelier features of the convention was the "wild goose chase," a trip arranged for the ladies, 28 of whom took part. They left the Hotel Lowry at 11:30 one morning by chartered bus. The group went through the Minneapolis "Loop," passing several buildings of interest, including the court house, public library, etc., and went up W. 7th St. from where the dome of the Cathedral could be seen. After more sightseeing, the ladies had luncheon at the Boulevard Twins Restaurant, where they could examine a display of antiques and gift items. After lunch, they spent considerable time browsing and inspecting the bakery adjoining the restaurant. More sightseeing was on the docket for the return trip, and the group arrived back at the hotel in plenty of time to rest up for the evening's festivities.

The business meeting closed this successful convention with the election of R. E. Walsh as president; R. J. Kraus, vice president; Arlowe Esau, secretary; A. O. Lassila, treasurer; and Fred Kuettel, sergeant-at-arms. Directors for one year are E. Charlebois, L. Schwickert, and A. B. Osgood. Directors for two years are Morgan Nelson, Roy Dose, and Willard Ahrens. President-ex-officio is H. T. Helle.

Roll Roofing Used as Ground Cover in Crawl Spaces

FIFTY-FIVE lb roll roofing is recommended for ground cover in crawl spaces of basementless houses in an article, *Durability of Moisture-Resistant Membrane Materials in Contact with the Ground*, which will appear in *Housing Research No. 4*, soon to be released by the Housing and Home Finance Agency, Washington, D.C.

The article summarizes recently compiled research on the durability of roofing felt and roll roofing when used for waterproofing materials in contact with the ground where they are subject to rot fungi, known as "dry rot," commonly associated with damp soil. The research was sponsored by the HHFA's Division of Housing Research, by contract with the Bureau of Plant Industry, Soils, and Agricultural Engineering of the Department of Agriculture, in cooperation with the National Bureau of Standards.

Research showed that unprotected 15 lb asphalt-saturated roofing felt in contact with the ground, either as soil cover in a crawl space house or as a membrane under a slab-on-ground floor, would be destroyed by dry rot in a few years. However, 55 lb roll roofing, which is heavily impregnated and coated with asphalt and is both durable and moderate in cost, would be expected to provide an effective and durable membrane for many years at little or no additional cost. Also, it has sufficient puncture resistance to permit periodic access to the crawl space for inspection.

The article also includes recommendations for installing membranes under slab-on-ground floors.

The publication contains several other articles as well in the field of home building. It is available from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C., for 30 cents a copy.

YOUR BUSINESS AND THE LAW

When Can You Return Defective Equipment?

Albert W. Gray

The buyer has a right to return defective equipment and recover the purchase price if he notifies the seller within a reasonable time. However, if he knew of the defects when he accepted the equipment, if he keeps it for too long a time, or if he returns it in worse condition, he cannot rescind the sale

AN AIR CONDITIONING system was installed in a restaurant under the agreement that it would be in good working condition. A down payment was made by the purchaser. Approximately a year after the installation and after months of futile effort to secure the necessary adjustments, the restaurant owner employed a second contractor to put the system in condition.

Later when the purchaser of this equipment sued to recover the amount he had spent for this additional work, the contractor who had installed the system demanded the unpaid balance of the purchase price.

In a decision awarding the contractor this amount which he claimed, but deducting the amounts paid for the repairs by the purchaser, the court said,

"There is clearly no basis for the cancellation of the indebtedness due the contractor from the customer which constitutes the balance of the purchase price of the air conditioning system, the purchaser having retained the plant and having failed to offer to return the machinery."

Buyer Has Right to Reject Equipment

An action many years ago came before the Supreme Court in which a buyer sued to recover the amount he paid for goods shipped at his order by a dealer in another state. The goods had not been the quality the customer had ordered and immediate notice was given the seller that the goods were held subject to his order and a refund demanded of the money that had been paid.

The seller contended that although the goods were not the quality agreed upon in the contract, nor such as the buyer could use in his business, nevertheless the customer could only recover the difference between the value of the goods he had received and the value of those he had expected to receive.

"The mere delivery of the goods by the seller to the carrier does not necessarily bind the buyer to accept them," said the Supreme Court. "On their arrival the buyer has the right to inspect them to ascertain whether they conform to the contract, and the right to inspect implies the right to reject them if they are not of the quality required by the contract."

The customer's objection however, must be made with the promptness demanded by today's standards of business. A decision to which the courts frequently refer as an authority in such instances related to a transaction in which a midwestern theater gave a six month promissory note for an organ. Later the note was extended two months. When after eight months the manufacturer demanded payment the owner of the theater protested, claiming the organ was unsatisfactory and offering to return it.

Must Return Goods Promptly

Holding that by his delay he had waived such a defense to the payment of this note, the court said, "While it is true the purchaser made many complaints that the organ was not in good condition in many respects, and while he offered to return the organ, he never did so. He should either physically have returned the organ to the seller or stored it in some warehouse in his name and sent the warehouse receipt to the seller.

"This he made no attempt to do. The actions of the purchaser regarding the possession of the organ and its use unqualifiedly indicated that the purchaser affirmed the contract. He cannot now be heard while in possession of the organ, to have any right to claim that he rescinded the contract, for every action was in law, an affirmance of the contract of purchase and the ownership of the organ."

Albert W. Gray, author of this article, has had twenty years experience as an attorney in the courts of New York City. He has written widely on legal matters and is the author of "The Family Legal Adviser".

The decisions of the courts point out that if an air conditioning contractor fails to install equipment as agreed or equipment capable of fit performance, the purchaser cannot use this to reject his bargain whenever he pleases.

In such an incident a purchaser contended he had not received what he bought. Nevertheless he continued for eleven months to use the property he had agreed to purchase at the end of that period asked a court to set aside the transaction on the ground that he had been deceived and imposed upon.

The case came ultimately before the Supreme Court of the United States and the decision rendered at that time has in the fifty years since, become an authority in determining these cases.

Continued Possession is Act of Ownership

"It is well settled by repeated decisions of this court that where a party desires to rescind upon the ground of misrepresentation or fraud, he must upon discovery of the fraud announce his purpose and adhere to it. If he continues to treat the property as his own, the right of rescission is gone and the party will be bound by the contract.

"In other words when a party discovers he has been deceived in a transaction of this character he may resort to an action at law to recover damages, or he may have the transaction set aside in which he has been wronged, by the rescission of the contract. If he chooses the latter remedy he must act promptly, 'announce his purpose and adhere to it,' and not by acts of ownership continue to assert right and title over the property as though it belonged to him."

The court here emphasized another factor. The buyer cannot look to the courts for the rescission of a contract when he knew the defects or misrepresentations either before or when he made the agreement.

"When the means of knowledge are open and at hand or furnished to the purchaser or his agent and no effort is made to prevent the party from using these means, and especially where the purchaser undertakes examination of the goods himself, he will not be heard to say that he has been deceived to his injury by the misrepresentations of the seller."

Buyer Knowing Defects Can't Claim Breach

A few years ago another incident of this character came before a court involving a written contract for the purchase of a soda fountain for which an old fountain was given in part payment and promissory notes executed by the buyer for the balance of the price, with the agreement that title should remain in the seller until the notes were paid. The seller after several months brought an action for possession of the soda fountain and in his defense the buyer interposed a counterclaim for breach of warranty.

In its decision of this lawsuit in favor of the seller and denying the recovery of any damages by the buyer, the court said,

"The buyer of an article has a reasonable time within which to inspect the article purchased by him. If the purchaser, however, knows of defects at the time of purchase or accepts the article after a reasonable time without inspection, he waives all objections on the ground of such defects.

"After discovering the defects he may elect to rescind the contract and recover back the purchase price, but he may not recover back the purchase price unless the contract is first rescinded."

Cannot Rescind Part of Contract

Another feature of this law that a purchaser may free himself from the obligations of the sale, cancel the agreement and recover whatever he has paid, is that all the contract must be cancelled or none of it. The buyer cannot retain so much of the benefits of the transaction as he would like and cancel the remainder.

"The purchaser," asserted the Federal Court of Appeals a few months ago, "is not permitted to affirm a contract in part and rescind as to the residue."

Air cooling equipment was sold by a dealer. Later the buyer, dissatisfied with his bargain, offered to return the equipment and demanded the refund of the money he had paid. The offer was refused at that time by the dealer and the customer, instead of holding the property subject to the order of the dealer as the law requires he should do, sold part of it for junk. Later the dealer offered to refund the purchase price and accept the return of the equipment which the buyer was unable to return.

When this buyer sued to recover the money he had paid, the court, holding there was no ground for such a recovery or for damages, outlined the principles of the law governing incidents of this character and the course that must be followed if the buyer is to secure the money he has paid for defective or misrepresented equipment.

Can't "Have Cake and Eat It Too"

"The buyer may rescind a contract of sale for breach of warranty and recover back the purchase price, or he may sue on the warranty and recover as damages the difference between the actual value of the goods at the time of the sale and what they would have been worth if they had answered to the warranty.

The court pointed out that the buyer cannot do *both* of these things, since the election of one remedy is a waiver of the other. That is, a suit to recover as damages the difference between the represented worth and the actual worth of the equipment is based on the warranty.

In a suit to set aside the sale and recover any payments made, the sale is assumed to be void because the equipment was not fit for the purpose for which it was intended; it was not what the purchaser bought.

The court went on to point out, however, that, "In order to recover the purchase price, based upon an offer

(Please turn to bottom of page 63)

ITEMS OF OVERHEAD

1. INTEREST
- Invested Capital
- Loans

2. RENTS
- Property owned by others
- Own property used in business
- Equipment
- Other

3. SALARIES
- Owners or Officers
- Department Managers
- Other Executives
- Office
- Engineering and Drafting
- Estimating
- Salesmen
- Supervision: Shop / Field
- Truck Drivers
- Non-Productive Labor: Shop / Field
- Bonuses
- Other

4. EMPLOYMENT-CHARGES
- Old Age Pension
- Unemployment Compensation
- Medical or Hospital
- Paid Vacations
- Other

5. INSURANCE — Business
- Fire and Extended Coverage
- Plate Glass
- Holdup and Burglary
- Civil Riot and Commotion
- Public Liability
- Property Damage
- Products Liability
- Business Interruption
- Other

6. LOSS
- Bad Accounts
- Materials Lost or Ruined
- Tools

7. PROMOTIONAL EXPENSE
- Advertising
- Entertainment
- Club Memberships
- Donations and Gifts

8. OFFICE
- Supplies
- Printing
- Postage
- Publications
- Travel Expense
- Association Dues
- Audit
- Legal
- Credit Service
- Collections
- Other

9. SERVICES
- Electric
- Water
- Gas
- Telephone and Telegraph
- Fuel and Heat

10. TRANSPORTATION
- Gas and Oil
- Tires
- Repairs
- License
- Insurance
- Other

11. DEPRECIATION
- Office Equipment
- Shop Equipment
- Field Equipment
- Transportation Equipment

12. MAINTENANCE AND REPAIR
- Building
- Equipment: Shop / Field

13. TAXES
- Local
- Personal Property
- Sales or Use
- Other

14. MISCELLANEOUS
- Inventory Shrinkage
- Other

FIG. 1—MANY ITEMS go to make up overhead costs

How to Calculate Overhead

N. J. Biddle

Secretary, Michigan Heating and Sheet Metal Association

To run his business properly, the contractor must know what items to assign as overhead costs. He should also have a working knowledge of the special methods for calculating overhead. These will help him determine the optimum amount of work which his shop can take on

A GOOD WORKING knowledge of overhead is essential to the proper conduct of a business. The tighter the competition, the more important such a factor becomes.

The application of general or overall overhead has been sufficiently discussed in this series, but not much attention has so far been given to the components of overhead.

How can you decide which items are to be included as part of overhead costs? We have previously defined overhead as all costs incident to carrying on the business of contracting which cannot be identified as direct job costs. Thus, business operations costs fall into one of two categories — direct job costs and indirect job costs or overhead. While what to include and exclude from overhead is to some degree controversial, there is little question about the majority of the items shown in Fig. 1.

As you will note, the items of overhead are set up in fourteen groups. The arrangement is not too important as long as all of the proper overhead items are included.

It is a very good plan, however, for purposes of tabulation, to group all of these items in some logical fashion. It will require the transfer of fewer figures for tabulation purposes, as will be explained later.

Items 1, 2 and 3, respectively, include interest on invested capital, rent for owned property used in the business, and owners' salaries or withdrawals for services other than direct job labor. These items are not deductible for income tax purposes. To accumulate data for tax purposes, the contractor should first get the total of tax deductible overhead items, and then add the total of these three non-deductible overhead items.

Interest on Capital Valid as Overhead

Interest on invested capital is the first item. In the proprietary company or co-partnership, not corporations, many claim that this is not a proper charge. However, if a person invests money in a corporation, he surely has a right to anticipate a return from it. No one questions such a right. Dividends are payment for the risk and use of the capital. If a person loans money to another, both parties thereto realize that interest for the loan is legitimate and proper.

If a going business borrows funds from any loaning agency, it expects to pay interest for such accommodation and the agency can legally recover such interest if it is not paid.

Anyone investing funds in his own business takes a chance on not making good and thereby losing such funds. Ordinarily the risk is fully as great, if not greater, than investing or risking money in a going concern.

Since the profit of a contracting firm is in part due to the investment of such capital, there seems no valid reason why the business should not be charged for the use of such funds and any earning therefrom credited to the investment.

Rents Also Valid

The same is true for the contractors' property which is used in the business. If he did not have the property, rent would have to be paid to another. If he did not use such property, it could be rented to another and thereby produce an income. It is only because of the ability to use such property, whether rented from another or his own, that a contractor can do business.

Therefore, the going rate for property of the kind used is a legitimate business charge. The rental does not properly accrue to the business but to the owner. If the business as such owns the property, then the accounting should be separated into two accounts so that the property earning or lack of earning can be properly shown.

Salaries or other compensation for the owner or owners of a company, another controversial item, involve all of the time spent on work or services by said parties, other than that spent on productive labor. Time spent on productive labor is a direct job cost and should be so charged. If others were employed to perform all of the

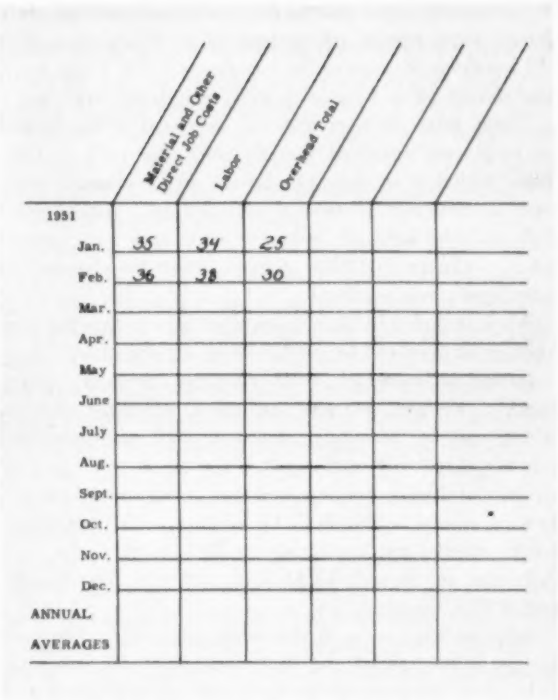


FIG. 2—ON THIS simplified tabulation sheet, the relationship of overhead and other items to sales can be shown in convenient percentages

functions usually embraced by ownership, they would have to be paid at, or better than, the going rate for the services rendered. There would be no question whatsoever but that such pay was a legitimate, tax deductible overhead, expense. While pay for the services of ownership in a non-incorporated company is not deductible as a business expense for income tax purposes, it is definitely a part of the cost of operating a business and should be so accounted for.

Only by paying for these legitimate costs or accounting for them, can one determine whether the business is being conducted on a paying basis or not. It may be that these other functions of the owner are making up for considerable losses in the actual business operation. Every contractor should know definitely whether the business is making a profit or if a fictitious profit is being generated from other sources.

Therefore, interest, rent of property and certain salaries are included in the listing of the items of overhead. Many contractors will find, if they keep their accounts on this basis, that the actual profiits of the business are smaller than they realized.

Most Labor Costs Not Overhead

Employment Charges, the fourth item, is another controversial one. These labor fringes (old age pensions, etc.) are occasioned because of the employment labor and are based upon the pay of employees.

As stated in a preceding article, the hourly labor rate and the hourly labor cost are two different quantities.

If the hourly labor rate is $3.00 an hour and there are fringe requirements which amount to 9 per cent, then the hourly labor cost to the contractor is $3. 27 an hour, and should be so figured in pricing jobs or services.

These labor fringes are not overhead when related to employees involved directly with the jobs. They were included in the tabulation of overhead items only as relating to owners, officers, etc., listed under *Salaries*, who are only indirectly connected with specific jobs. Otherwise, labor fringes must be charged to labor costs, not overhead.

When included in labor costs, they may reduce the percentage of overhead by perhaps 1 or 2 per cent.

Incidental material costs are not properly overhead. Freight, cartage, or other handling charges which can be definitely identified with an individual job are direct job costs. If the cost of some item of equipment like a heating unit for a gravity warm air heating system is $98.00 F.O.B. factory, with freight and handling charges amounting to $17.15, then the cost delivered on the job is $115.15, not just the original cost F.O.B. factory.

Sales or use tax is in the same category. The cost to you is the cost of the item, plus any taxes involved.

In some cases, the shelf cost should be established and in others, such as the one previously mentioned, the transportation and handling costs can be allocated directly to the individual job.

The inclusion of such costs is a recognized principle with the Office of Price Stabilization and should be so regarded by the contracting fraternity.

Must Allocate Costs Correctly

The definition of proper accounting as given in a preceding article was, *Proper accounting means the complete, accurate systematic recording of every transaction involving money or value.*

This definition can now be changed to read, *Proper accounting means the complete, accurate, systematic recording and proper allocation of every transaction involving money or value.* The accounting practice of a concern might be complete, accurate and systematic, but unless all of the items are properly allocated, it might not give the proper answers. Proper allocation of such money or value items is equally as important as any of the other requirements for an accounting system.

If job cost items are allocated to overhead and the earnings from capital and facilities are credited to business earnings, then the purpose of proper accounting is partly defeated, for the prime purpose of keeping accounts is to be able to find out at any time exactly what is happening in the business, dollar-wise.

How to Project Future Overhead

The great problem confronting the contractor at all times is how best to project his future overhead. There is no assurance that it will continue to be what it was yesterday, last month or last year.

This is equally as difficult a proposition as trying to determine the cost of a future job. Perhaps it is even more so because there are a number of completely unpredictable factors which affect overhead. Then, too, in estimating a job, there is only one job to contend with, while estimating future overhead involves the cost calculations of every job.

Since overhead basically is the ratio or relationship of all indirect job costs to sales, it naturally follows that any change in the dollar amount of either will change this relationship, unless such changes are exactly proportional and in the same direction.

Increase in the dollar volume of sales or a decrease in the dollar amount of overhead without a corresponding change in the other factor will decrease the percentage of overhead. The reverse is likewise true. The only way overhead can be maintained at or near a constant ratio or percentage is to maintain this balance, which means controlling one's overhead.

The alternatives for a company whose sales are sliding is to either reduce the dollar amount of overhead or boost sales. There is no other out. Competition will not usually allow for abnormally high prices, which precludes applying the true overhead when it is abnormally high. So such a company is usually faced with the necessity of doing one or the other of the above alternatives or losing money.

Should Tabulate in Percentages

Most experienced firms have a monthly profit and loss statement. Some of these statements show every item or grouping of items of expense as percentages of sales. Thus, material purchases would be shown as a percentage of sales, as would labor, rent, heat, light, power, office salaries, etc. It is much easier and more revealing to compare percentages than to compare other figures which are continuously changing through a considerable range of dollars. Percentages usually are relatively static unless considerable changes take place in the basic figures.

Your percentage tabulation should at least show the relationship of material to sales, labor to sales, miscellaneous items to sales and overhead to sales. This tabulation may be used to great advantage, as will be shown later.

Fig. 2 is a suggestion for a simple tab sheet which will give a lot of answers for the several different purposes mentioned in this article. These items are all to be in percentages of sales.

It can be readily seen that a single sheet would accommodate the percentages of three years at least and make them readily available for comparison or any other purpose which might be desirable. The other major overhead divisions or groups could also be worked into percentages and included here in further columns to the right.

It would also be possible to take a base year or even just a figure out of the air as a sales base, add another

column for the sales percentage of the base and you could measure progress month by month.

This tabulation would show seasonal trends at a glance if the sales figure were added. Carried on systematically, it would become a most valuable asset to any business. It would only take a few minutes a month to keep accurately and up to date and would become increasingly valuable with the passing years.

Overhead Varies with Seasons

Some businesses are more greatly affected by seasonal conditions than others. Take, for instance, the heating industry. During the heating season, the contractors in northern climates are often completely and literally snowed under with service or replacement calls, and with installing heating jobs in new buildings. The weather, too, often affects their ability to perform. All in all, the seasons can produce a wide variation in business volumes and the incident costs.

Unfortunately, when business is at its lowest cycle, overheads are usually at their highest percentage, so the contractor is prevented from raising his prices accordingly because of competition and the resistance of the customer to suddenly increased prices. Under the government price control program, it was impossible to do so. Furthermore, this procedure would only result in forcing a greater volume of work during the rush periods when the actual overhead was probably at its lowest level, as the public began to realize this cyclical pricing situation.

The only solution for the contractor is to average his overhead percentage over a complete cycle, which means the year.

Vast changes may take place in that year both in the business climate and in the individual company, so that last year's overhead average becomes increasingly hazardous for estimating purposes as it recedes into the distance. The more current the basis of overhead projections can be kept, the better.

Rolling Overhead Can Be Used

The most effective and practical method of projecting overhead into the future is by using what may be termed *rolling or progressive overhead.*

Usually profit and loss statements have been completed by the 10th of the month following that to which they apply. Here is the method of computing the rolling or progressive overhead.

Assuming that a contractor keeps a chart tabulation as suggested, with the overhead worked out in percentages for at least the preceding 11 months, he then adds the percentage for the immediate past month to the other 11 months, which divided by 12, will give the average monthly overhead for the past 12 months.

As the figures for each succeeding month are available, the same process should be repeated. In this fashion, one constantly has the benefit of a year's average plus the added advantage of having it as nearly current as possible.

This manner of determining overhead will quickly reflect trends in a business and enable the contractor to have a much better control of his business than would otherwise be possible. Tabulating these figures in chart form will give a graphic picture of the seasonal fluctuations, their duration, show those which are recurrent year after year and give a lot of valuable information concerning such fluctuations.

Simply stated, the procedure would be: Each month, average the overheads of the 12 preceding months. This figure, with any sound adjustments, would be the overhead percentage for use in figuring jobs for the next 30 days. Of course, the same thing could be done on a quarterly basis but it is not so sensitive to trends as is the monthly base.

RETURNING DEFECTIVE EQUIPMENT—

(Continued from page 59)

to return the goods purchased, the buyer must adhere to his tender and act consistently therewith.

"Moreover, after an attempted rescission by the buyer which the seller has not accepted, the buyer, if he intends relying upon it, must adhere thereto and act consistently therewith and if he thereafter continues to use the property as his own he may be held to have waived or abandoned the rescission and may be precluded from rescinding or asserting a claim that he has rescinded. In other words, the use of the goods sold by the purchaser after the seller has refused the latter's tender to him in a rescission of the contract, defeats the attempted rescission if the property was used for the personal benefit of the purchaser."

A provision of the statutes of 35 of the states, the District of Columbia, as well as Alaska and Hawaii, which is also substantially the law laid down by the courts in the states in which statutes have not been enacted governing a rescission of a sale contract is:

"Where the goods have been delivered to the buyer, he cannot rescind the sale if he knew of the breach of warranty when he accepted the goods, or if he fails to notify the seller within a reasonable time of the election to rescind, or if he fails to return or offer to return the goods to the seller in substantially as good condition as they were at the time the property was transferred to the buyer. But if deterioration or injury of the goods is due to the breach of warranty, such deterioration or injury shall not prevent the buyer from returning or offering to return the goods to the seller and rescinding the sale."

(Note: While this discussion applies to actual cases, it should be remembered that legal rules vary in different states.)

Making a 90 Deg Rectangle to Round Elbow

Hugh B. Reid

Instructor, Sheet Metal Pattern Drawing

The square throat of the elbow fitting discussed here permits connection in a minimum amount of space. The installation used as an example is an exhaust system over a range, but the fitting applies to any application of a similar nature

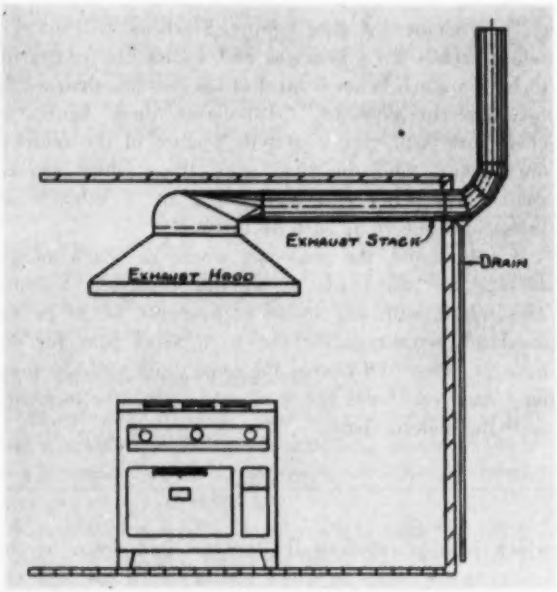


FIG. 1—HOOD LOCATED over a range showing the 90 deg transition and condensate drain location

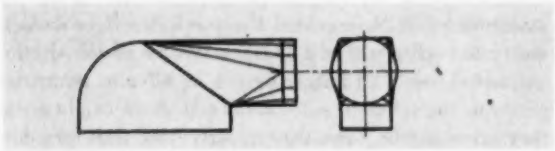


FIG. 2—FRONT VIEW *(left)* and end view *(right)* of 90 deg rectangle to round elbow as required for installations illustrated in Fig. 1

THERE ARE many applications to which a rectangle to round 90 deg elbow can be applied. Of these, a gravity exhaust system over a range has been chosen for illustration and discussion.

In installations of this type, the problem confronting the designer is the limited space between the top of the hood and the ceiling. The square throat of the 90 deg rectangle to round elbow fitting will permit a connection to an existing hood in the minimum amount of space; this will apply as well to any installation of a similar nature.

Rules for Exhaust Systems as Shown on Fig. 1:

When an exhaust duct passes through a fire wall, a fire damper, held in an open position by a fusible link, must be installed in the duct, and a hand hole provided adjacent to the damper. The fusible link should have a temperature rating approximately 50 F above the maximum temperature that would normally be encountered with the system in operation.

The damper should be designed to close in the direction of the air flow. Where ducts pass through walls, floors, or partitions, the space around the duct must be sealed with rope asbestos or other non-combustible material to prevent the passage of flame or smoke.

When the exhaust duct goes through an outside wall only, as shown on Fig. 1, a damper will not be required.

A pipe should be provided at the bottom of the elbow for suitable drainage.

Following is a step by step analysis of the pattern problem solution.

To Construct Method Drawing Marked Fig. 3:

(a) Draw the 3 in. horizontal line marked Y-Z. From points Y and Z draw lines perpendicular to line Y-Z. Measure ½ in. and mark the points W, X.

(b) From point Z, measure 1 in. horizontally and 1-⅛ in. vertically and establish the point O. With O as center and given radius ⅝ in., draw a half circle; through point O draw a line perpendicular to line Y-Z and mark the intersection points of the half circle and the vertical line U and V.

(c) Divide the half circle into eight equal spaces and through the points draw lines perpendicular to and intersecting line U-V.

(d) From point W, draw a line perpendicular to Line Y-W. On this line measure 1-¼ in. and establish the point O′. With O′ as center and radius 1-¼ in. draw the 90 deg arc, W-T.

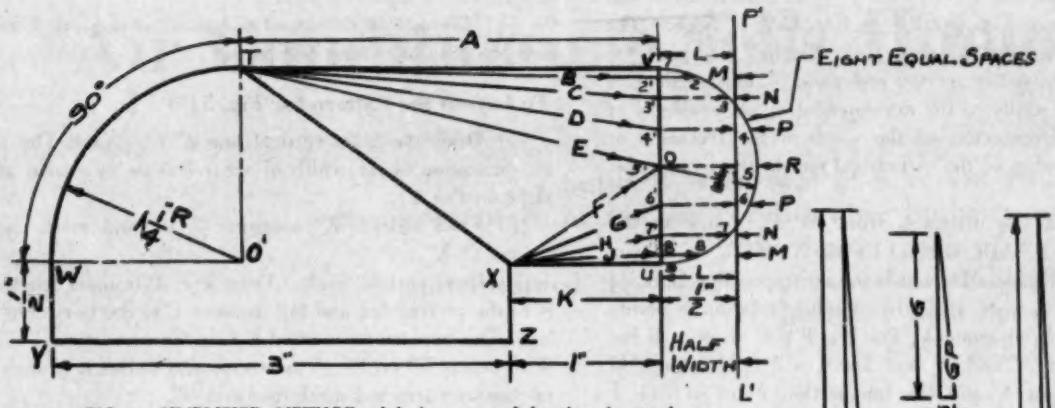


FIG. 3—SIMPLIFIED METHOD of laying out and forming the 90 deg elbow

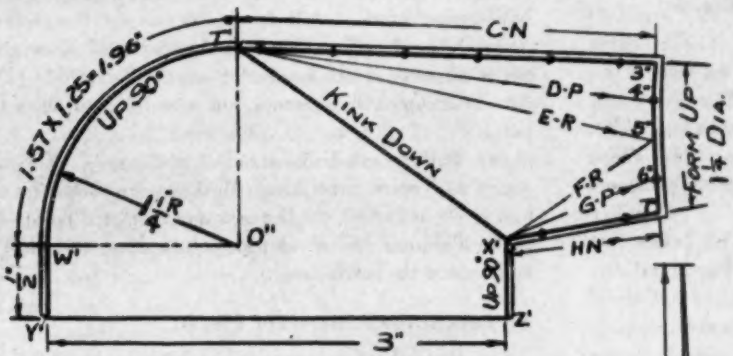


FIG. 4— FRONT PATTERN layout marked for cutting and braking

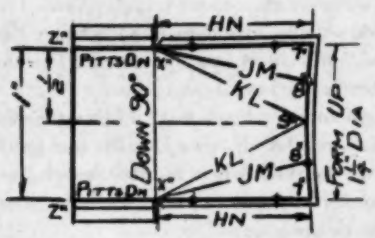


FIG. 5—PATTERN OF THROAT shape, showing Pittsburgh lock edging plus other dimensions

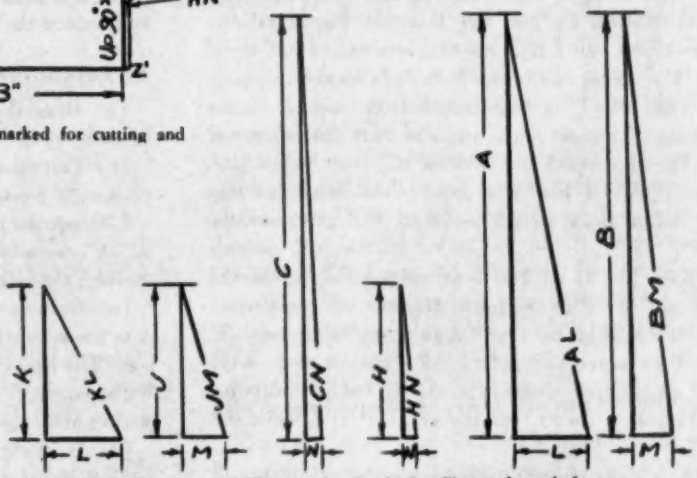


FIG. 7—TRUE LENGTH lines for developing Figs. 3 through 6

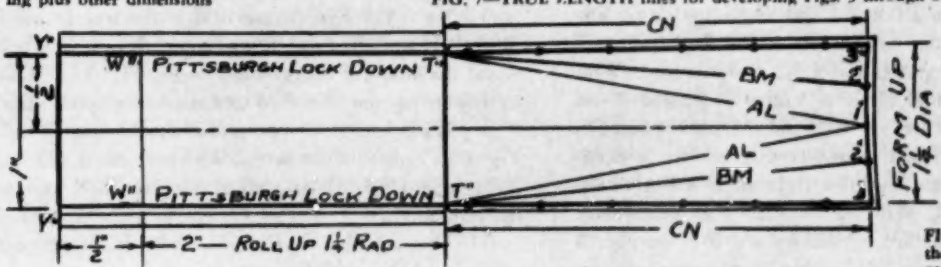


FIG. 6—BACK PATTERN for joining the two sides. Note the ½ in. dimension line W"—W"

FIG. 8—PICTORIAL of the 90 deg rectangle to round elbow

(e) From point T, draw lines A, B, C, D, E. From point X, draw lines F, G, H, J, K. Draw the line T-X.

(f) From line U-V, measure ½ in. and through this point draw a line parallel to line U-V. Note: The ½ in. dimension is taken from the half width of the rectangle as shown on the end view. This method of layout will apply to the development of all problems of this type, irrespective of the width of the rectangle or the relationship of the cylindrical end to the rectangular end.

(g) Mark the distances from the P′-L′ line to the points on the half circles, L, M, N, P, R, as shown. These are distances by which the corresponding lines A, B, C, D, E, F, G, H, J, K, rise or fall in relation to points T and X. As an example, line E will rise distance R between points T and O; and line J will fall distance M between point X and the intersection point of line J and line U-V.

To Layout the Front Pattern Marked Fig. 4:

(a) Draw the 3 in. horizontal line Y′-Z′. From these points draw lines perpendicular to line Y′-Z′. Measure ½ in. and mark the points W′, X′.

(b) From W′, draw a line perpendicular to line Y′-W′, from W′ measure 1-¼ in. and mark the point O″. With O″ as center and radius 1-¼ in., draw a 90 deg arc and mark the point T′. Draw the line T′-X′.

(c) Draw a right angle. From Fig. 3 transfer line E to the vertical leg and rise R to the horizontal leg. The developed line E-R is the true length line. With T′ on Fig. 4 as center and radius E-R, draw an arc.

(d) The line F is transferred from Fig. 3 to the vertical leg of a right angle and rise R to the horizontal leg. The developed line F-R is the true length line. With point X′ on Fig. 4 as center and developed line F-R as radius, draw an arc to cut arc E-R and mark the point 5″.

(e) With line D on Fig. 3 as the vertical leg on the triangle and rise P as the horizontal leg, the hypotenuse marked D-P will be the true length line. With point T′ on Fig. 4 as center and radius D-P draw an arc. With arc R-P on the half circle (Fig. 3) as radius and point 5″ on Fig. 4 as center, cut the arc D-P and mark the point 4″.

(f) On a right triangle transfer length C from Fig. 3 to the vertical leg and fall N to the horizontal leg. The hypotenuse CN is the true length line. With point T′ on Fig. 4 as center and radius C-N, draw an arc. With arc P-N on Fig. 3 half circle as radius and point 4″ on Fig. 4 as center, cut the arc C-N and mark the point 3″.

(g) Line G and rise P transferred from Fig. 3 to the vertical and horizontal legs of a right angle will give the developed line G-P. With X′ on Fig. 4 as center and radius G-P, draw an arc. Measure arc R-P on Fig. 3 half circle and with point 5″ on Fig. 4 as center, cut the arc G-P and mark the point 6″.

(h) Transfer line H and fall N from Fig. 3 to the horizontal and vertical legs of a triangle and mark the hypotenuse H-N. With H-N as radius and point X′ on Fig. 4 as center draw an arc. Measure arc P-N on the half circle (Fig. 3) and with 6″ on Fig. 4 as center cut arc H-N and mark the point 7″.

(j) Through the developed points draw the work lines and the pattern outline of Fig. 4.

To Layout the Pattern for Fig. 5:

(a) Draw the 1 in. vertical line Z″-Z″ (Note: The 1 in. dimension is the width of the rectangle as shown at right on Fig. 2).

(b) From line Z″-Z″ measure ½ in. and mark the points X″-X″.

(c) Draw a right angle. From Fig. 3, transfer length K to the vertical leg and fall distance L to the horizontal leg. The hypotenuse marked K-L is the true length line. With points X″ on Fig. 5 as centers and radius K-L draw intersecting arcs and mark the point 9″.

(d) Transfer line J and fall distance M from Fig. 3 to the vertical and horizontal legs of a right angle. The hypotenuse marked J-M is the developed line. With points X″ on Fig. 5 as centers and radius J-M, draw arcs. Set a compass at arc length 9-8 on the half circle (Fig. 3). With point 9″ as center, cut arcs J-M and mark the points 8″.

(e) With length H-N as radius and points X″-X″ on Fig. 5 as centers, draw arcs. With arc length 8-7 on the half circle as radius, cut the arcs and mark the points 7″.

(f) Through the developed points draw the pattern outline and the work lines.

To Layout the Pattern for Fig. 6:

(a) Draw the 1 in. vertical line Y″-Y″. From Y″-Y″ measure ½ in., and draw the line W″-W″.

(b) Calculate the length of the 90 deg arc by multiplying the given radius by the constant 1.57. Thus, 1.57 x 1.25 equals 1.96, or approximately 2 in. From line W″-W″ measure 2 in., mark the points T″-T″ and through the points draw a line.

(c) Draw a right angle. From Fig. 3, transfer line A to the vertical line and fall distance L to the horizontal leg. The hypotenuse marked A-L is the true length line. With points T″ as centers and radius A-L draw intersecting arcs and mark the point 1″.

(d) Working from Fig. 3, transfer length B to the vertical leg of a triangle and fall distance M to the horizontal leg. The hypotenuse B-M is the true length line. With B-M as radius and T″ as centers draw arcs. Measure equal division 1-2 on the half circle (Fig. 3). With 1″ as center, cut the arcs B-M and mark the points 2″.

(e) With length CN as radius and points T″-T″ on Fig. 6 as centers draw arcs. With arc length 2-3 on the half circle (Fig. 3) as radius, cut arcs C-N and mark the points 3″.

(f) Through the developed points draw the pattern outline and the work lines.

The collar length is calculated by multiplying the given diameter by 3.14.

Add allowances for seams and joints and mark patterns for forming.

"Air Conditioning Sells Homes"

. . . builders were told at a recent convention. Representatives of the air conditioning industry explained the basic types of equipment and outlined the benefits of air conditioning to both builders and home owners

HOME BUILDERS are more interested than ever in air conditioning. This was evidenced at the Ninth Annual Convention and Exposition of the National Association of Home Builders, which was held January 18 to 22 at the Conrad Hilton Hotel, Chicago. A steady stream of contractors continued, throughout the meeting, to ask questions of air conditioning manufacturers represented at the booths — questions about safety features, floor space, clearance requirements, costs, etc.

In addition, a survey made public at the meeting showed that building contractors intend to make year 'round indoor weather control a major feature in thousands of medium-priced homes to be built throughout the United States in 1953.

Of 255 prominent builders covered by the NAHB survey, 104, or almost 40 per cent, said they will offer air conditioned homes to the buying public this year. Nine others indicated they would do so if the system did not add too much to the cost of the house.

Those replies came from home builders in 30 states, extending from New England to Florida and from the Atlantic seaboard to the West Coast.

Seventeen builders said they would limit air conditioning to their higher-priced homes, generally above $20,000, or would include it only as an optional feature for which the buyer would have to pay extra.

The overwhelming majority, however, plan to offer the extra convenience and comfort of built-in air conditioning as standard equipment in their middle-priced housing.

The survey was an outgrowth of a recent meeting between NAHB officials and representatives of the country's leading air conditioning manufacturers. The manufacturers said they were prepared to mass produce systems this year for use in homes selling for $15,000 and under.

Representative Areas Offering Air Conditioning

Home air conditioning already is off to a "flying start" in Texas and other parts of the Southwest, where some builders have introduced it within the past year in housing priced as low as $10,500. The NAHB survey showed that air conditioned homes will be offered this year to average income families in such northern cities as Buffalo, Rochester and Elmira, N.Y., Hartford, Conn., Chicago, Flint, Mich., Minneapolis, and Portland, Ore.

One Bronx, N.Y., builder said he will air condition a low priced housing project he is erecting this year. A Jacksonville, Fla., builder said he plans to do the same thing in single family houses priced as low as $10,000, and another in Albuquerque, N.M., said he is installing evaporative air conditioning systems in homes selling for as little as $7600.

Builders in San Antonio, Oklahoma City, and Louisville, reported plans to air condition up to half the houses they erect this year. The Tulsa Home Builders Association said that about 1500 air conditioned homes priced between $14,500 and $18,500 are planned for that area this year.

Other representative areas in which 1953 home buyers will be offered built-in air conditioning at modest prices include Long Island, N.Y., Providence, Baltimore, Philadelphia, Pittsburgh, Columbus, Akron, Dayton, Toledo, Lincoln, Nebr., Knoxville, Memphis, Chattanooga, Sioux City, Des Moines, South Bend, Indianapolis, Wichita, St. Louis, Kansas City, Mo., Dallas, Fort Worth and Houston.

Discusses Benefits of Year 'Round Conditioning

The benefits of year 'round air conditioning for both the home buyer and the home builder were stressed, in one of the meeting's key talks, by J. F. Knoff, Airtemp Div., Chrysler Corp. The home buyer, he pointed out, gets the benefits of greater comfort, better health, lower cleaning costs, greater relaxation, greater property value, and improved living standards. There is less housework to do. The builder benefits because he meets a new public demand, provides up-to-date modern living, gains added profit, builds prestige, gains construction benefits, and helps create a replacement market, he stated.

Mr. Knoff offered some merchandising suggestions on how to "educate" real estate salesmen and others, discussing demonstrations which dramatize the idea that clean air means less housework, better health, etc. He also emphasized the importance of adequate installations, pointing out that the builder must closely analyze low price bids, and the installer's knowledge, experience and integrity. Operating expenses based on local factors

should be clearly defined to the buyer, he feels.

In addition to offering specialized information, Mr. Knoff explained the general aspects of residential air conditioning — what it is and how it works.

Air Conditioning — A Selling Tool

"The luxury tag on residential air conditioning has been torn up and thrown away," stated A. E. Meling, Carrier Corp., in another talk delivered at the meeting. He gave examples of the selling power of air conditioning, pointing to a St. Louis project of 69 air conditioned homes, 49 of which were sold before the display house was even opened for public inspection. Citing another example in the North, he pointed out that air conditioning will be a selling factor in almost any locality in this country.

"It gets hot in Chicago, in Detroit, in Minneapolis, in Cleveland, just about everywhere. It may not stay hot for long, but it still presents a summer discomfort problem. In some areas the problem is high humidity, like virtually the entire eastern seaboard. In other localities, you get intense dry heat. And . . . in the cooler climates, people are not as well acclimated to heat. 90 degrees to a resident of Milwaukee is apt to feel like 102 degrees to a resident of St. Louis."

Mr. Meling went on to explain the basic principles of year 'round residential air conditioning, showing slides of a schematic of a packaged unit, and of a heat interchanger, and explaining how they work.

In discussing the benefits of air conditioning to the builder, he pointed out a number of new construction possibilities which it offers. More windows in the home can be fixed. Solid walls are practical where desired. Screens can be eliminated. The roof pitch can be lowered if an attic fan is eliminated. A screened porch can be eliminated. All these factors tend to reduce building costs and make a home more salable.

In addition, low-cost home designs (for example, two rooms and bedroom and a kitchen with only one window exposure), which are frequently compromises or even bad designs from a comfort standpoint, become completely satisfactory designs with air conditioning. He also stressed that no additional space requirements are needed for air conditioning units, which take little or no more space than a good heating plant.

"Flywheel Effect" Also Means Savings

After describing the comfort zone chart of the ASHVE, Mr. Meling explained why comfort could be achieved in residences using smaller equipment than people usually realize.

He outlined the differences between a residential structure and other structures in relation to comfort, pointing out that in a residence, there is less heat from people in proportion to the structure, that the heat load from people is fairly constant, rather than being concentrated during an 8 hour working or shopping day. Also, a residence has more capacity to store cooling in its structure and furnishings in proportion to the total requirement.

He went on to say that where in commercial and industrial structures you must have cooling capacity to counteract a sudden access of heat from people and machines, you don't need that sudden pulldown capacity in residences. At night, in homes, you can store enough cooling in the walls without lowering temperatures beyond the maximum comfort zone to take care of a substantial part of the sun load during the day. This 24 hr method of load calculation means smaller equipment, lower operating costs, less frequent cycling of the cooling equipment, and therefore less fluctuation in humidity. These factors mean lower selling prices, more comfort, and more sales for the home builder.

He concluded with the point that "houses with air conditioning offered as an optional device and yet depending on air conditioning for their sales appeal rarely are sold, either with or without the optional air conditioning, because such an offer means the merchandiser doesn't believe in his own chief selling feature."

Varied Air Conditioning Equipment Available

The various basic types of air conditioning available to home builders for use in residences were outlined and illustrated by S. J. Levine, General Electric Co.

He pointed out that since the requirements for residential applications can be considerably standardized as compared to industrial or commercial requirements, manufacturers have been able to offer packaged equipment at prices which permit merchant builders to feature year 'round comfort in their mass produced homes.

The available equipment includes combinations of practically every type of heating and cooling method. Because of the growing demand for warm air heating in modern homes, with its features of filtering, humidifying, and air circulation, it was natural that the manufacturers develop their cooling products to fit in with this trend. Mr. Levine discussed only central plant systems.

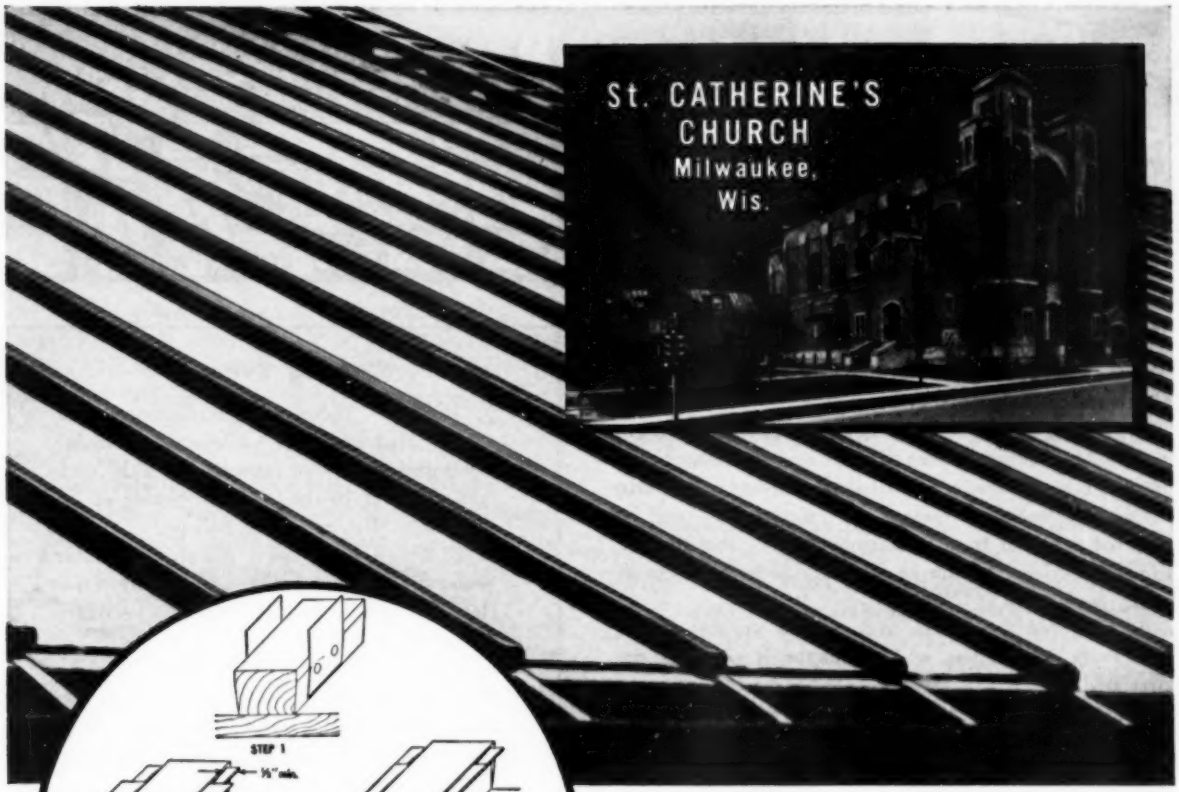
He first described the heat pump and its method of operating. Its summer operating cost, he said, is comparable to that of other refrigeration or cooling units. In winter, its operating cost, compared to other equipment using solid, liquid, or gaseous fuels, will be entirely dependent on the cost of electric power, and will, in general, cost about 1/3 as much as straight electric resistance heating.

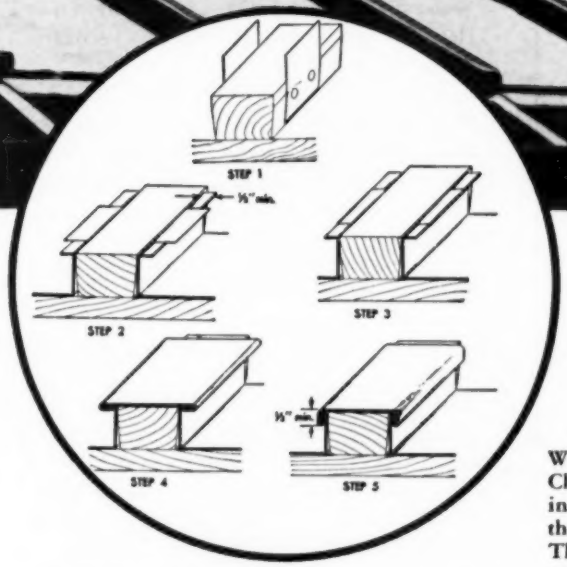
Describes Combination Systems Using Water

After covering water saving devices (forced draft cooling towers, use of a spray pond, etc.), Mr. Levine went on to describe combination systems using water. He illustrated and discussed a completely self-contained year 'round air conditioner, consisting of an indirect steam heating system, an absorption refrigeration unit, an air filtering section, and a centrifugal fan section.

The balance of the equipment he showed utilizes direct fired heaters and mechanical refrigeration. He showed a "heater-cooler" unit which uses a remote or

(Please turn to page 148)





MORE THAN 30,000 LBS. of 20 oz. Revere plain and lead-coated sheet copper was used for the roof and gutters of St. Catherine's Church. The through-wall flashing used is also of lasting copper.

Architects, William G. Herbst & Associates: General Contractors, Gebhard-Berghammer, Inc., Sheet Metal Contractors, Reinke & Schomann, Inc., Revere Distributor, Inland Steel Products Company, all of Milwaukee.

Top photo shows section of batten seam roof on St-Catherine's Church. Inset diagram shows the 5 steps in the development of a batten seam as recommended in Revere's Booklet, "COPPER AND COMMON SENSE."

While battens may vary to suit the architectural style it is good practice to make them ¼" narrower at bottom than at top to allow for expansion.

(STEP 1) Copper cleats not less than 2" wide are secured to sides of battens, spaced not more than 12" o.c. and placed to project 1" above batten if ½" double lock seam is used as shown. (STEP 2) Sides of batten pans are turned up at right angles with a horizontal flange. (STEP 3) Cleats are bent over horizontal flange as shown. (STEP 4) Caps are placed over batten and edges bent over horizontal flanges of pans. (STEP 5) A ½" lock is then formed by bending down projecting flanges against sides of batten.

ANOTHER CASE OF Copper WHERE IT COUNTS

When architects design such landmarks as the St. Catherine's Church, they simply can't afford to specify untried materials in the spots where faultless performance is a must . . . in this case the roof, gutters and the through-wall flashing. That's why copper was used. Not only has it proved itself over the centuries but it is a non-rusting metal that combines more desirable construction characteristics than any other single metal. Copper is also preferred by sheet metal contractors because it is so readily worked and soldered.

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Honorary Membership for Artisan's Editor

THE ANNUAL CONVENTION of the Sheet Metal and Roofing Contractors Association of Minnesota was held January 8 to 10 in St. Paul. The highlights of this convention are reported in the main editorial section of this issue. During the business session, Richard E. Walsh, Co-chairman of the convention, presented the resolution — and he received approval from the membership — that the editor of American Artisan be made an honorary member of the association.

It is indeed a privilege to become a member of the Minnesota Association, and the honor is sincerely appreciated.

Canadian Chapter Holds Ninth Annual Meeting

THE 1952 CONVENTION of the Canadian Chapter of the National Warm Air Heating & Air Conditioning Association was held at the Chateau Frontenac, Quebec City. J. R. Taylor reported that manufacturer membership had increased by two, while chapter membership remained the same as last year, with 836 members. H. W. Follows, reporting on the chapter's promotional program, made use of display cards to illustrate the cooperation the Canadian chapter is receiving in both the Canadian and American trade press. T. A. Clark, technical director, stated that in the 12 schools held last year, the average attendance was 46.3 delegates per school, for a total of 594. He reported that since 1945, when the education program was started, 3099 men have attended warm air heating schools.

Officers elected are: president, C. E. Israel and vice president, F. A. Sheldon. Elected to the Board of Directors are: L. C. Whealy, F. R. Rand, T. H. Bulloch, H. H. Proctor and H. T. Williams.

The chapter reports that there have been several instances in which newly developed warm air heating systems have been excluded from installation by local codes, owing to the fact that such systems were not covered in the design manuals of the association. In order to avoid this in the future, the chapter has revised the warm air heating master code by preparing an addendum to the intent of the code. The addendum clause, a new manufacturers' member list, and a revised cover page have been prepared for distribution.

Builders Attend Kalamazoo Meeting

HOME BUILDERS in the Kalamazoo area were invited to attend the January meeting of the Kalamazoo Sheet Metal, Roofing, Heating & Air Conditioning Contractors' Association to hear C. W. Nessel of the Minneapolis-Honeywell Regulator Co. speak on the subject of warm air perimeter heating. Mr. Nessel, who had spent several months in various sections of the United States with the National Warm Air Heating & Air Conditioning Association field testing laboratory crew, was well

Coming Events

Feb. 16-19 — Industrial Ventilation Conference. Michigan State College, East Lansing. Developed by Div. of Industrial Health, Michigan Dept. of Health, and the School of Engineering, Michigan State College.

Feb. 23-25 — Ohio Sheet Metal Contractors' Association, Annual Convention. Mayflower Hotel, Akron. Wm. C. Lumm, Secretary, 2512 Albion St., Toledo.

Feb. 26-27 — Michigan Sheet Metal, Roofing, Heating and Air Conditioning Contractors' Association, 42nd Annual Convention. Hotel Durant, Flint, Mich. N. J. Biddle, Secretary, 3035 E. Grand Blvd., Detroit 2.

Apr. 15-16 — Sheet Metal Contractors' Association of Illinois, Inc., Annual Convention. Jefferson Hotel, Peoria, E. A. Schmidt, Secretary, 1210 E. Laurel St., Springfield, Ill.

Apr. 20-22 — Oil Heat Institute of America, Inc., Annual Convention. Edgewater Beach Hotel, Chicago. R. H. L. Becker, Managing Director, 6. E. 39th St., New York 16.

May 4-6 — Sheet Metal Contractors' National Association, Annual Convention. Jung Hotel, New Orleans. J. D. Wilder, Executive Secretary, 170 Division St., Elgin, Ill.

June 17-19 — Sheet Metal, Air Conditioning and Roofing Contractors' Association of Pennsylvania, Annual Convention. Hotel Lawrence, Erie, Pa. E. W. Liebermann, Secretary, Ambridge, Pa.

June 29-July 1 — American Society of Heating and Ventilating Engineers, Semi-Annual Meeting, Denver. A. V. Hutchinson, Executive Secretary, 62 Worth St., New York 13.

equipped to give builders and warm air heating contractors valuable information pertaining to the preparation of buildings for this type of heating.

California Group Announces 1953 Courses

IN ADDITION to the subjects of forced air, gravity and perimeter heating, and floor and recessed wall heaters, the Engineering School, Institute of Gas Heating Industries, Inc., Los Angeles, has scheduled the subjects of ventilating, evaporative cooling and air conditioning. The course for 1953 has been broadened in time and scope and is geared for the advanced student. The Sales Training School, which has been separated from the Engineering School, will cover the subject, *Advanced Techniques in Selling Heating, Ventilating and Air Conditioning.* Salesmen are encouraged to enroll in both courses.

The Institute is sending out forms to its members listing a schedule of active committees for 1953 and requesting that members check the committee or committees they would like to serve on. In this way, all members will have an opportunity to indicate where their interest lies and in what manner they would like to participate in administering the affairs of the organization. For the year 1953, the Institute says, its program requires the active participation of at least 64 of its members.

Carolinas Association Holds Mid-Winter Board Meeting

THE BOARD OF DIRECTORS of the Carolinas Roofing and Sheet Metal Contractors Association held its mid-winter meeting in the Hotel Barringer, Charlotte, December 3 and 4.

President Joe H. Piper of Greenville, S.C., presided at the first meeting. He announced the selection of the Ocean Forest Hotel, Myrtle Beach, S.C., for the 1953 convention, to be held in June. Last year's convention also was held there.

An open forum was held on new mechanized equipment for installing roofs, such as pitch pumps, felt layers and gravel spreaders.

At the first day's luncheon, the group heard an address on *Safety and Cooperation*, by Fred F. VanAtta, manager, Building Div., Carolinas Branch, Associated General Contractors of America. A representative of the North Carolina Engineering Foundation, N.C. State College, expressed the appreciation of the Foundation for the contributions of the Carolinas group towards an engineering professorship.

Speakers Scheduled for Michigan Convention

SCHEDULED TO SPEAK at the convention (Feb. 26 to 27) of the Michigan Sheet Metal, Roofing, Heating and Air Conditioning Contractors' Association are I. M. Nelson, Boston Machine Works; R. C. Look, Gas Burner Service Co.; and J. Clark, Airtemp Div., Chrysler Corp.

St. Louis Group Installs New Officers

INSTALLATION OF new officers of the Associated Sheet Metal, Air Conditioning and Heating Contractors of St. Louis, Inc., took place on Saturday, January 31. A dinner dance at the Edgewater Club was held in celebration of the event.

OFFICERS AND DIRECTORS elected by the St. Louis association are: *(l. to r.)* Front Row—William Vogt, treasurer; Louis Otten, vice president; Vincent Welsch, president; Ray Neise, secretary; Richard Weis, sergeant at arms; Back Row—Robert Mass, counsel; Ralph Albright, Wallace Cavallo, O. Keaton, Louis Droste and N. V. Doll, directors

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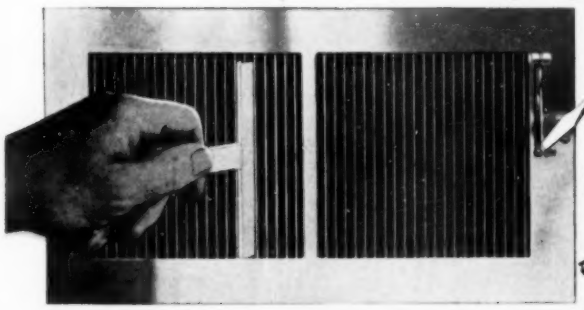

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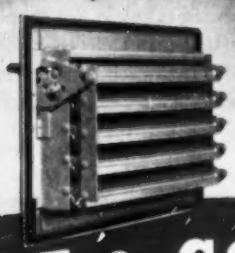

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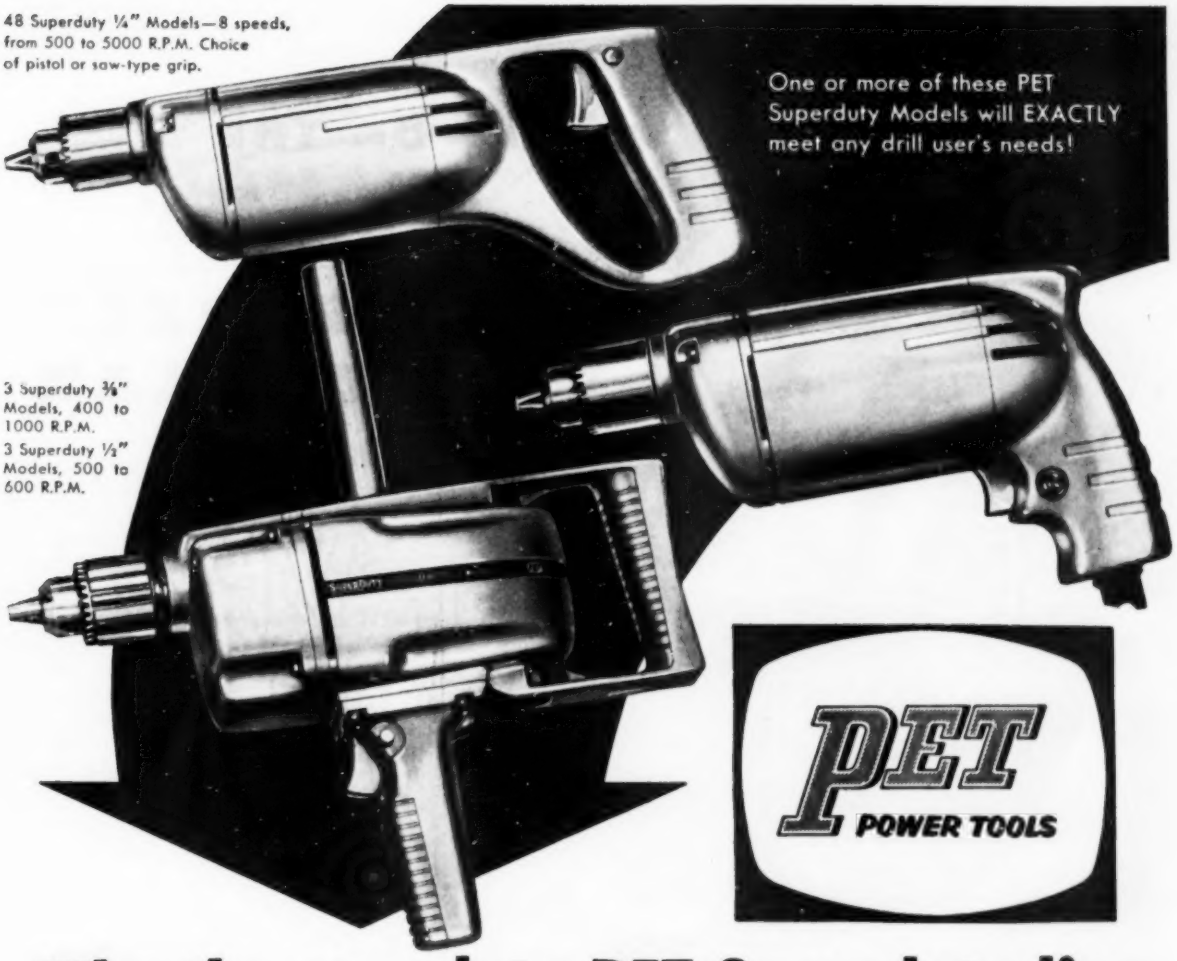

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Why the complete PET Superduty line offers you the right drill for *YOUR* job!

Any maintenance or production man will agree that the right drill for the right job means three things: better work, greater efficiency and longer drill life. So why compromise on a drill that's "almost" right?

PET Superduty Drills are available in 54 separate and distinct models . . . the various speeds and rated power have been carefully selected on the basis of what industrial users have needed and asked for. Result? You get a wide selection . . . and end up getting the drill that's *exactly right for your work.*

And, a wide selection isn't the only thing you'll like about the PET Superduty line. Just plug in one of these drills: feel the vibration-free power as it flows from a dynamically-balanced armature through precision-cut gears. Then you will know you've found a drill that will stand up in rugged service day in and day out—and still come back for more!

For complete details on the best in electric drills—sold at prices that will come as a pleasant surprise—find out the name of your nearest PET Distributor. Write today, to Portable Electric Tools, Inc., Dept. AA-23 320 West 83rd St., Chicago 20, Ill.

Be sure to ask for this free catalog!

Compare these quality drills for yourself . . . model by model, feature by feature. This illustrated catalog gives you the complete story. Free copy by return mail.

The features you want are the features you get—in PET Superduty Drills

- **Reserve Power; for the extra-tough job**
- **Heavy-Duty ball and needle bearings**
- **Precision-Cut, Heat-Treated Gears; for smooth, quiet power flow**
- **Dynamically Balanced Armatures; for freedom from vibration**
- **Forced Ventilation; for cool running**
- **Aluminum Alloy Die Castings; for light weight, easy handling**
- **Compact Design; makes hard-to-reach drilling jobs easier and faster**
- **Meet U. S. Government and Military Specifications**

PET POWER TOOLS

PORTABLE ELECTRIC TOOLS, INC.

320 West 83rd Street, Chicago 20, Illinois

In Canada: Portable Electric Tools, Ltd., Toronto, Ontario

ON THE *Peerless* "MIDDLE-SIZE" JOB PLAN

Are you one of the hundreds of heating and ventilating distributors, dealers and contractors having trouble getting and servicing the "middle-size" jobs? Many lack man power and time to compute fan and blower specifications, required engineering, pricing and deliveries. That is why Peerless came up with a plan to help you get these profitable "middle-size" jobs, and here's how the Peerless Plan works:

1. When a problem requiring technical assistance arises, just wire, write or phone Peerless, collect, and an experienced engineer will furnish the desired information or recommendations quickly and concisely . . . we'll even fly a man to your location if necessary.
2. Technical data is constantly supplied to you by mail.
3. Through constant research Peerless has developed possible new applications for electronics, radar, etc. Peerless can help you sell more of these jobs.
4. Peerless makes shipments on time, building your reputation as a dependable supplier.
5. Peerless furnishes a complete line of self-contained units . . . all manufactured under one roof . . . with undivided responsibility.
6. Peerless protects you with a full guarantee on each product.

By using this plan, heating and ventilating men have made bigger profits . . . sold more of the "volume" jobs. You, too, can benefit. Phone, write or wire Peerless, collect, on your next job or your present requirements.

"SMOOTHEST PERFORMERS ON THE MARKET"

Peerless Electric

THE PEERLESS ELECTRIC COMPANY

1405 WEST MARKET ST. • WARREN, OHIO
FAN AND BLOWER DIVISION

A Deluxe Unit... *for your customers who want the best!*

the gas fired

MOHAWK

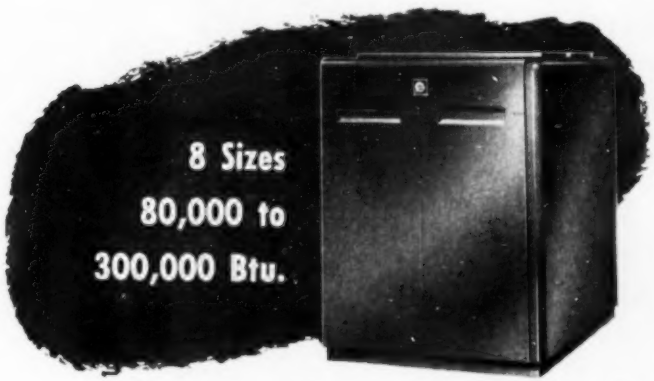
WINTER AIR CONDITIONER
by

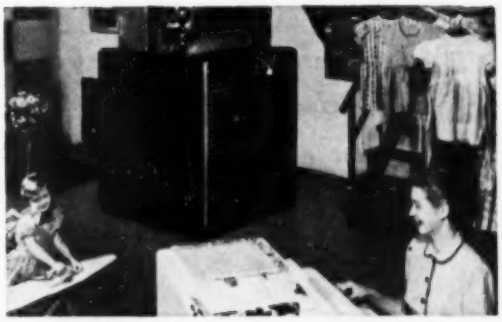
AMERICAN-Standard

IN the field of warm air heating equipment, the Mohawk winter air conditioner is tops. It's a quality product through and through.

Made of cast iron for extra durability, longer life and quieter operation, the Mohawk is available in eight sizes with capacities ranging from 80,000 to 300,000 Btu input per hour. High temperature alloy ribbon burner burns natural, manufactured, mixed, liquefied petroleum and LP-air gas uniformly and sparingly.

The handsome jacket is a real eye-catcher on your sales floor and enhances any basement setting. For detailed information on this deluxe unit and other gas fired winter air conditioners in the complete American-Standard line, contact your wholesale distributor.





Right for small, medium and large homes

In every community there are many home owners who will buy nothing less than the best! And you can sell them all! For the Mohawk is available in sizes and models for any home, whether large or small. Selling modernization jobs to this type of buyer is a big market in itself. The picture shows such a job made in a large Pennsylvania home by Bell Plumbing & Heating Co.

...and for multiple installations

You'll also find it comparatively easy to sell your share of multiple installations such as the apartment house job shown above. This particular installation involved the sale of five Mohawk winter air conditioners in a 25-room apartment building in Omaha, Nebraska, by Gordon Furnace and Sheet Metal Works. Every community offers many opportunities for jobs like this.

American Radiator & Standard Sanitary Corporation, P. O. Box 1226, Pittsburgh 30, Pa.

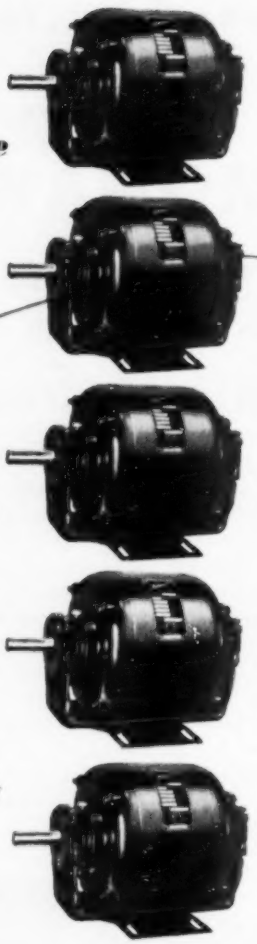
AMERICAN-Standard
HEATING

Serving home and industry

AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS

year in . . . year out . . . more and more appliance manufacturers turn to

PACKARD ELECTRIC MOTORS



for:

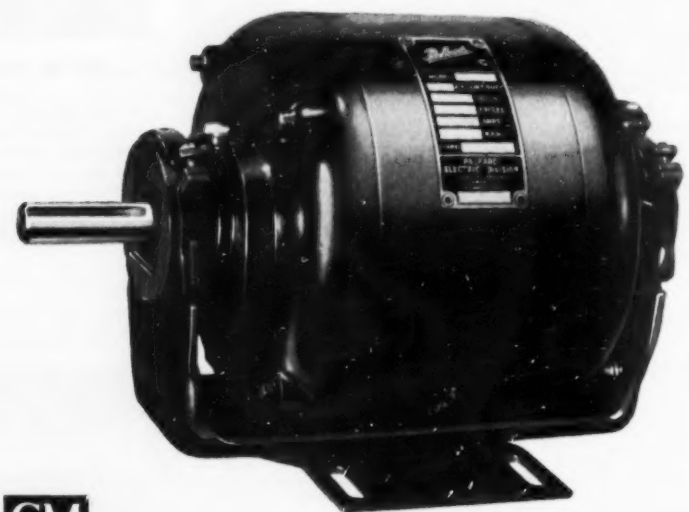
DRYERS
WASHERS
IRONERS
WATER PUMPS
LAWN MOWERS
OIL BURNERS
BLOWERS
VENTILATING UNITS
STOKERS
DISPOSAL UNITS
BENCH TOOLS
COMPRESSORS
MILKING MACHINES
CREAM SEPARATORS

Manufacturers who produce motor-powered products in volume know from experience the advantages of using motors of Packard Electric. A motor especially adapted to the product fits better in the space available . . . provides correct starting and operating torques . . . is built to stand up on the job.

If you manufacture a motor-powered product, Packard Electric engineers can help . . . can design the motor that will assure you of satisfactory product performance for your customers. And Packard Electric, with its tremendous facilities, can mass produce the motor for you—at low cost.

That's why we suggest you talk with Packard Electric about any motor problem. Packard can provide the right motor for you.

DEPENDABLE APPLIANCE MOTORS FOR THIRTY-SIX YEARS



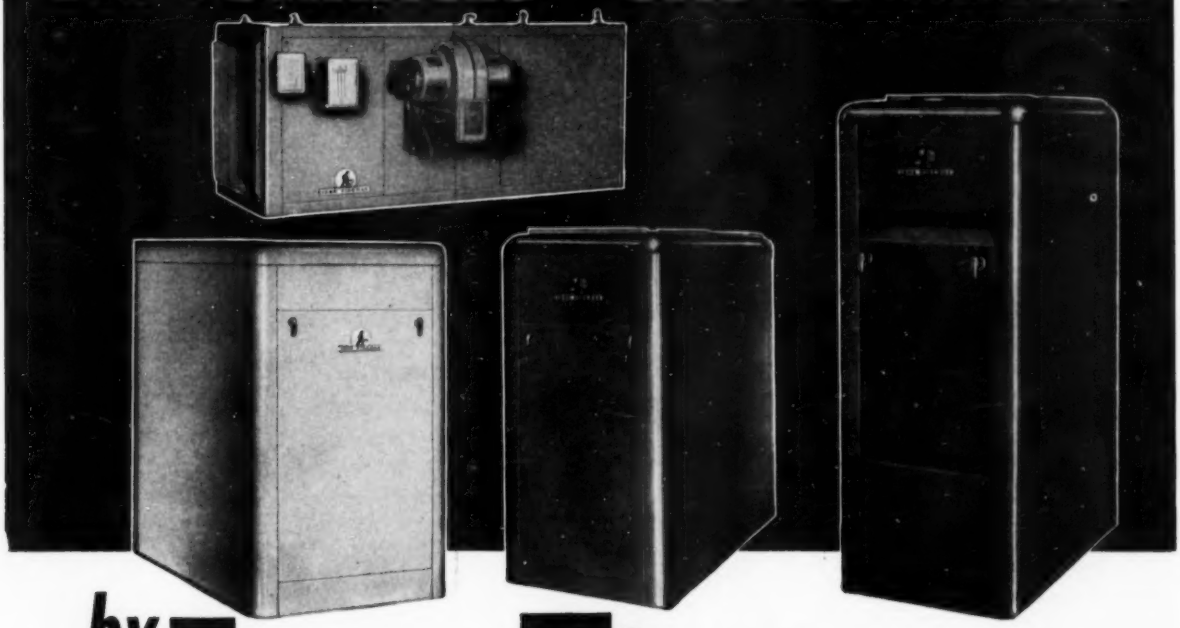
GM GENERAL MOTORS

Packard

REG. U.S. PAT. OFF. TRADE MARK

Packard Electric Division
General Motors Corporation
Warren, Ohio

OIL FURNACES ★ GAS FURNACES



by Iron Fireman

You can cover the whole furnace field with Iron Fireman

You are really "set" with the Iron Fireman line. There's a furnace for every need . . . a furnace that will fit in the smallest space, or one that will heat a mansion. They range from 45,000 to 270,000 Btu. input rating; from lower cost gravity models to complete winter air conditioners. They are trim, sleek, handsome—a credit to any home. Easily installed, they give *fast* heat and substantial fuel savings.

Tops in customer satisfaction

A source of satisfaction to users and dealers alike is the complete dependability of Iron Fireman equipment. Trouble-free comfort in the home translates itself into profitable business for *you*.

Loaded with strong selling points

The Iron Fireman radiant fire is *different*. It is a quick, super-efficient fire which reaches top efficiency in a few seconds, making Iron Fireman furnaces, boilers and conversion burners very responsive to thermostat control and ideal for "fast cycling."

Excellent territories available. Write for information to
Iron Fireman Mfg. Co., 3099 W. 106th Street, Cleveland 11, Ohio

Most complete franchise in the entire automatic heating field

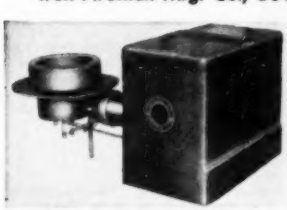
1. The unique features and outstanding fuel economy that are built into the Iron Fireman oil and gas furnaces make them easy to sell.

2. The Iron Fireman trademark, with 27 years of continuous national advertising and user satisfaction behind it, gives all Iron Fireman equipment exceptional salability.

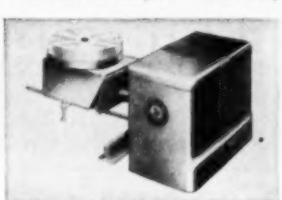
3. Iron Fireman has a complete line of residential, commercial, and industrial equipment.

4. There's automatic equipment . . . a full line . . . for oil, gas and coal.

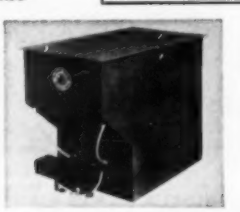
5. Iron Fireman dealers receive strong company backing which includes local advertising, merchandising, sales training, and engineering assistance.



OIL CONVERSION



GAS CONVERSION



OIL FLOOR FURNACE

OIL WALL FURNACE

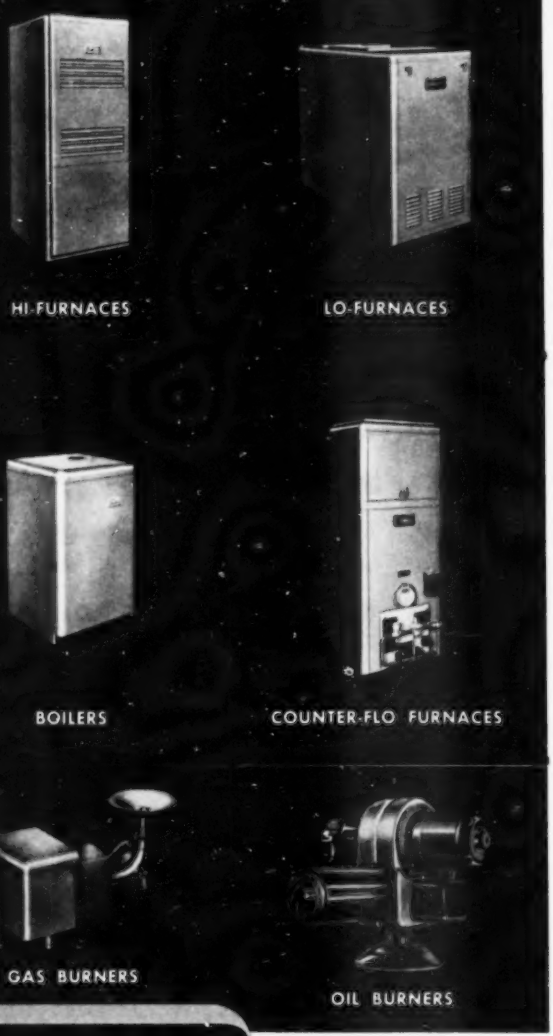
The new Silent Automatic line

a BIG HIT with wholesalers and retailers!

Alert heating men know a good thing when they see it! Displayed at the International Heating and Ventilating Exposition at Chicago in January, the new Silent Automatic line attracted widespread interest among sales-minded wholesalers and their retailers. They saw gas-fired and oil-fired home heating equipment to meet the requirements of virtually every size and style of home. Even more important, they saw a *quality* line—designed, built and nationally advertised to sell!

a BIGGER HIT with your customers!

A hard-hitting national advertising campaign is telling the great Silent Automatic value story to home owners. They'll learn that this equipment is soundly engineered and quality-built with every desirable feature to provide top heating efficiency and satisfaction. And they'll know it's backed by the greatest name in automatic heating—Timken Silent Automatic Division—their assurance of years of trouble-free heating comfort. That's why *you* want to get in on the ground floor of this profit-making opportunity. Wholesalers are being appointed *now* for choice territories all over the country!



wholesalers!

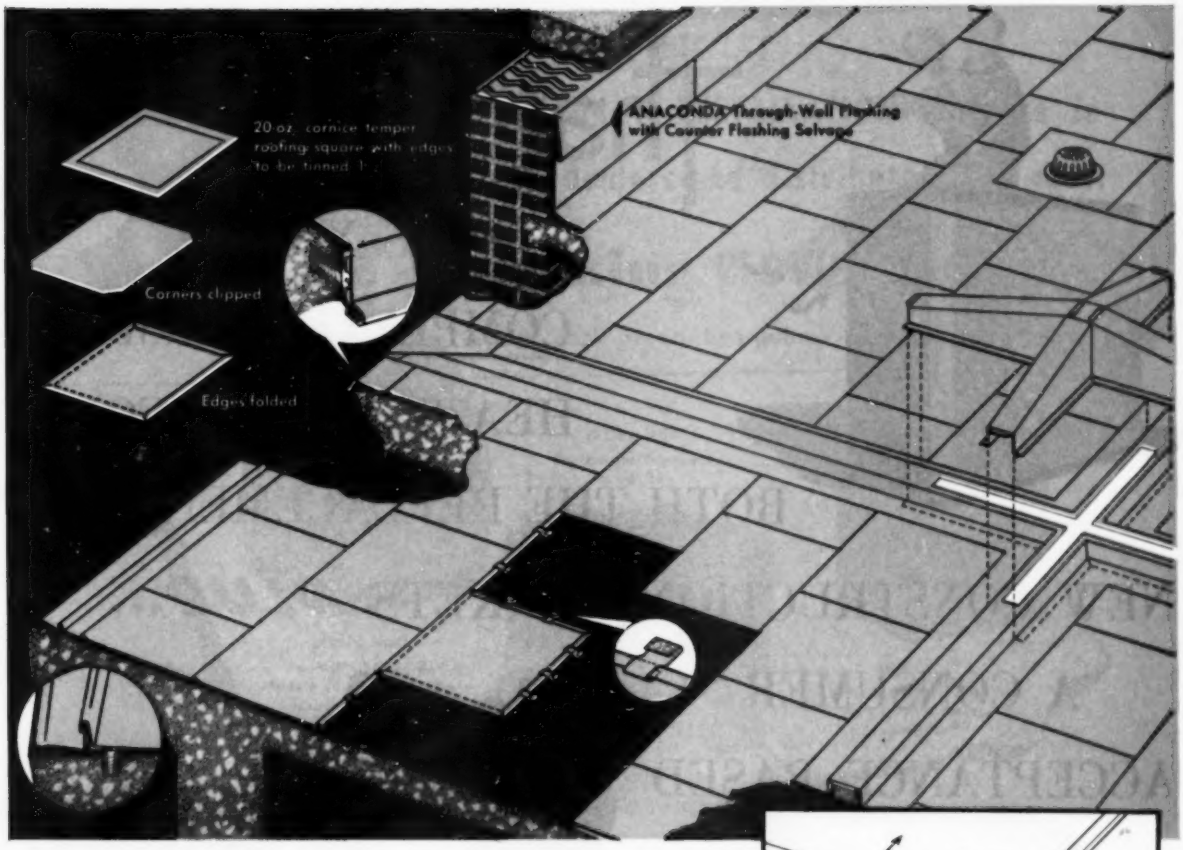
Write to R. E. Loebell, National Sales Manager—Silent Automatic Products, Timken Silent Automatic Division, Jackson, Michigan, for complete information about this new line.

Silent Automatic
HEATING EQUIPMENT

retailers!

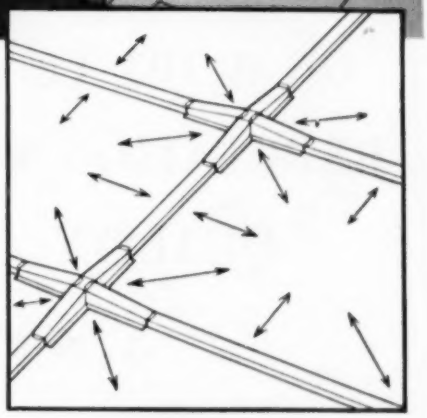
Write to R. E. Loebell, National Sales Manager—Silent Automatic Products, Timken Silent Automatic Division, Jackson, Michigan, for the name of the nearest Silent Automatic Products wholesaler.

A COMPLETE LINE OF GAS-FIRED AND OIL-FIRED FURNACES AND CONVERSION BURNERS, AND GAS-FIRED BOILERS. ALSO OPTIONAL GAS OR OIL FURNACES.



HOW TO PROVIDE FOR EXPANSION

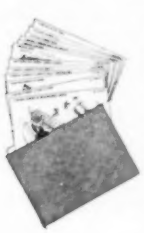
in watertight, flat seam copper roofing



Flat roofing presents a special expansion-contraction problem because seams must be soldered to be watertight—and yet the metal should be allowed to expand or contract freely with changes in temperature.

This drawing illustrates how this problem can be met by dividing the roof into rectangular areas approximately 40-ft. square, separated by expansion battens with expansible intersections. This permits contraction or expansion of the copper to or from the center of each rectangle without causing excessive stress.

Note the construction of the expansible cover which caps the intersection and is soldered to the expansion battens. Note, also, the methods of finishing the roof edge for various types of building design.



Do you have the FREE Anaconda file of drawings?

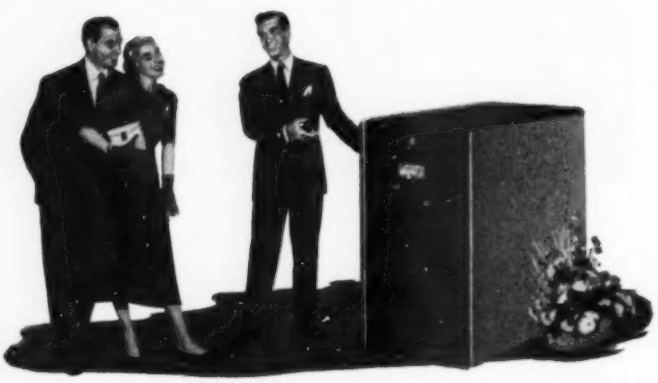
Each drawing shows a new or improved way to apply sheet metal. Each is printed on a separate 8½ x 11-inch page, handy for quick-reference filing. This entire series may be obtained absolutely FREE. Write today for Portfolio S to The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

for better sheet metal work—
use
ANACONDA® COPPER

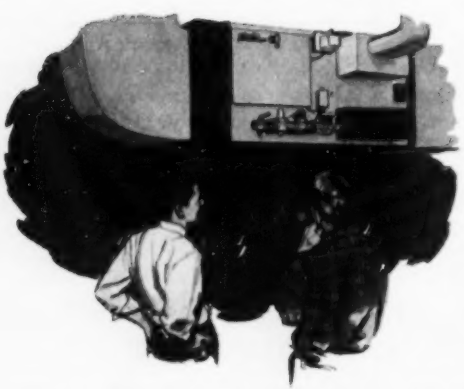
Thatcher

OFFERS YOU A COMPLETE WARM AIR HEATING LINE FOR BOTH THE REPLACEMENT AND NEW CONSTRUCTION MARKETS *PLUS...*

A CONSUMER ACCEPTANCE BASED ON A 103 YEAR REPUTATION FOR QUALITY.



...AND HERE'S THE NEWEST—



THE *522*

HORIZONTAL

GAS-FIRED

WINTER AIR CONDITIONER

55,000 B.T.U. at Register • A.G.A. approved for all city gases and L. P. gas • Completely factory assembled • Unusually compact (only 13¾" x 25⅛" x 49") • Can be suspended from ceiling joists or installed in crawl space or attic.

THATCHER FURNACE COMPANY

GARWOOD, NEW JERSEY

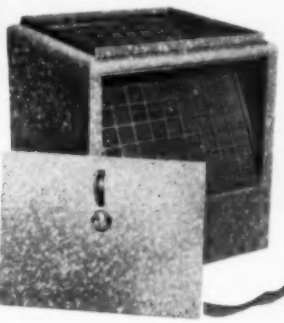
WINTER AIR CONDITIONERS • FURNACES • GAS BURNERS • OIL BURNERS • BOILERS

"IN CONNECTICUT . . .

The 'ONE-MAN-INSTALLATION' Feature is what my dealers and distributors like most about Viking BLOWER PACKAGES,"

reports Jack Green, Energetic Viking Representative

SERIES '400'
"Qui-Ette" Streamline Models for Popular Size Furnaces up to 28"



SERIES '300'
For Larger Furnaces up to 36"

THE "777"
WITH DIRECT DRIVE
For Small Furnaces up to 18"

"I'm strong for the increased inventory turnover I get with Labor-Saving Viking Blowers," says

MITCHEL LANDAU of Heating Equipment Center, New Haven, Conn.

"I don't have any dead stocks of blowers on my hands. It's always easy to sell my dealers a Viking Blower when they see how simple it is to install one. The 'one-man-installation' feature cuts installation costs to the bone."

"The Viking Blower is at the top of the list in my book. I can put one in by myself, and once it's in — it's in! I don't have to worry about service call-backs cutting down my job profit. It can't be beat."

RUSS HOBSON,
Russ Hobson and Girls,
Wilbur Avenue, Meriden, Conn.

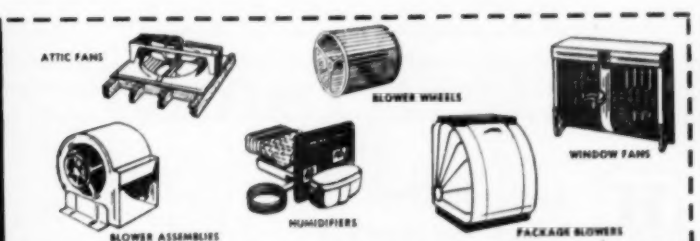
"I like Viking blowers because my men don't have to squeeze and squirm trying to get at the interior. The snap-out filter bar ledge lets us get into the cabinet to do the job in a hurry. That means I can do more jobs and make more money because I save more time on every job."

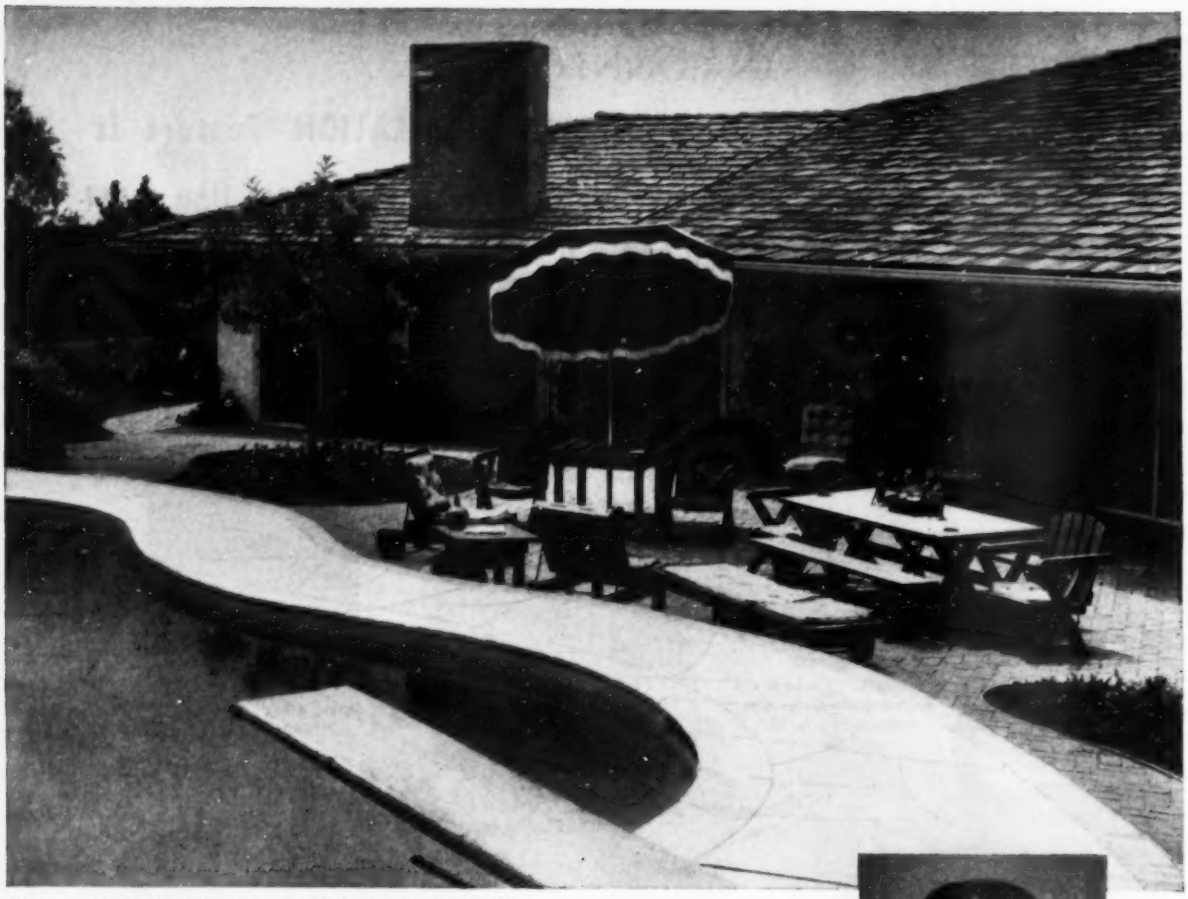
MICHAEL "MIKE" DE MUSIS, De Musis Bros., Inc.,
60 St. John Street, New Haven, Conn.

Viking

AIR CONDITIONING CORP.

Cleveland 2, Ohio





The beautiful home of Mr. & Mrs. Howard C. Fletcher, Sr., Altadena, California

"In California Zone Control is practically a necessity for real comfort"

says dealer contractor Al Ottum of Los Angeles

Al Ottum, owner of Radiant Sales and Engineering Co., Los Angeles, California.

"Sure. The rambling ranch-style house that dominates the landscape out here must be *zoned* to provide real comfort.

"I found that out when I engineered and installed my first zone control job seven years ago—to say nothing of the some 400 jobs I've put in since then.

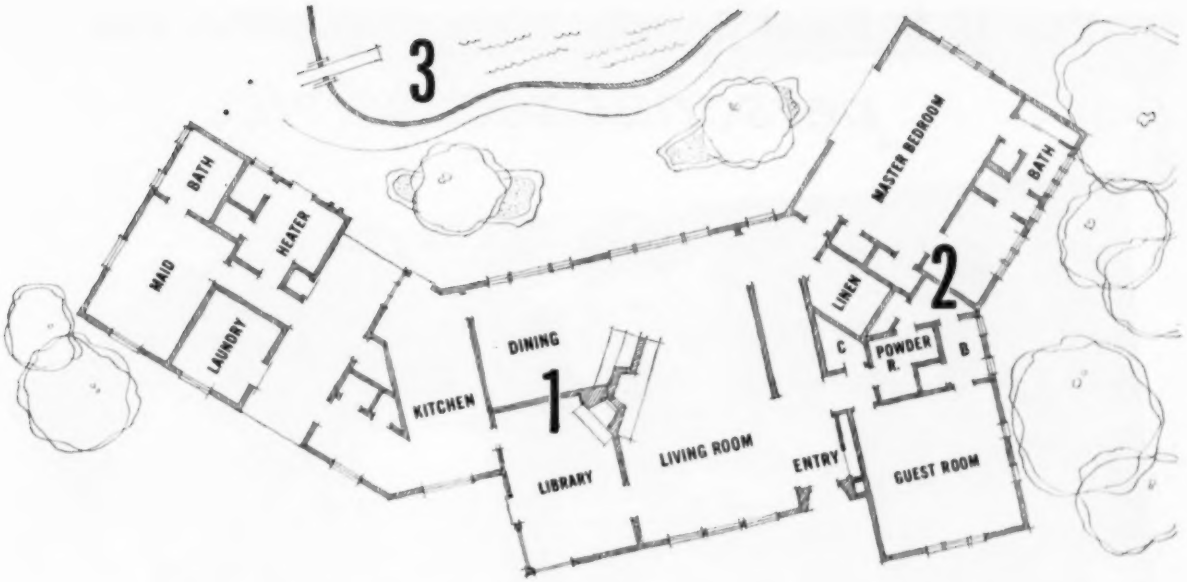
"But when talking to a home owner, I never try to sell a *Zone Control system*, as such. Rather, I talk of comfort and convenience; how an entire home can be maintained at a perfect level of comfort always, by simply having it zoned according to its living areas and outside exposure; and how the bedrooms can be kept at a different temperature from the rest of the rooms, for more healthful sleeping.

"A heating job well done should give the heating contractor personal satisfaction as well as a good profit. I've found I get *both* with every Honeywell Zone Control job I install.

"I set the controls to maintain the temperature my customer wants, and have no worries about future service calls. The only thing I leave is a *satisfied customer*—every time."

H HONEYWELL

Another Plus-Profit Product from Honeywell



"Many customers – like the Fletchers here – tell me they forget they even have a heating system!"

"Probably the finest compliment that can be paid to a heating contractor is to have a customer come back and tell him: 'Why, we don't know we even *have* a heating system!'

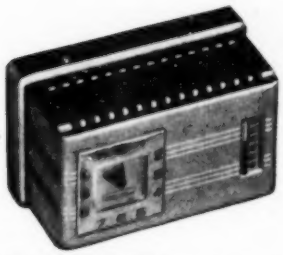
"As you can see from the diagram above, I broke the Fletcher home down into three areas of control. The living and service area is maintained at 72 degrees; the bedrooms at a lower temperature for more comfortable sleeping. The third zone is for radiant panels in the swimming pool.

"The Fletchers never dreamed such comfort was possible. And they couldn't get over the fact that the same equipment that heats the house also provides a comfortable pool temperature. They saw and appreciated how this meant economy as well as a less complicated boiler room.

"Zone control is easy to install. And I like to use the Honeywell electronic system because it is by far the best control system made. It's simple, and has few moving parts to wear out."

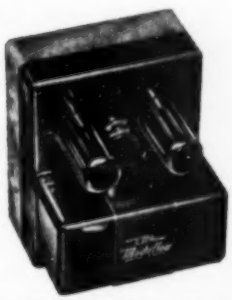
Honeywell has controls for any type zone control job!

Here are three examples:



1. Electronic Chronotherm – famous, fully automatic clock thermostat. Provides night shut-down, automatic morning pick-up for 24-hour control.

2. Electronic Weathercaster – located outside the house. It senses and sends signals on changes in the weather to the system indoors, automatically.



3. Electronic Relay Amplifier – receives and sends messages for heat *in proportion* to heat demands sent by Chronotherm indoors and Weathercaster located outside the house.

For complete information and application data on famous Honeywell Zone Control, call the Honeywell office nearest you. There are 104 of them located across the country. Or write Honeywell, Dept. AA-2-36, Minneapolis 6, Minn.

MINNEAPOLIS **Honeywell**

First in Controls

H HONEYWELL

The U. S. Steel Supply team that gives you *personalized service*

Our "speed specialist" keeps your order on the move!

OUR traffic manager hates to hold your order in our warehouse. As soon as it is an order—for steel, tools, equipment or machinery—he gets it out of our warehouse and into your plant as fast as possible. For local delivery, he dispatches a fleet of specialized trucks and a crew of competent drivers who are proud of their record for quick, dependable service.

If you specify delivery or routing instructions on out-of-town shipments, our traffic manager will see that they are followed exactly. If you leave the routing up to him, he will schedule delivery so as to give you the best possible protection in the matters of both cost and service. He studies the special unloading requirements of each of our customers, and ships accordingly.

When special conditions—speed, convenience or any other—should be observed in the delivery of your order, you can get the *personal* attention of our traffic manager through your U. S. Steel Supply salesman or telephone salesman.

YOUR "ONE CALL" SOURCE OF STEEL SERVICE

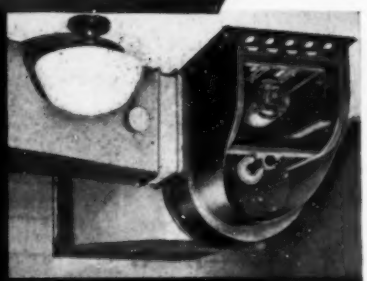
U.S. STEEL SUPPLY

UNITED STATES STEEL SUPPLY DIVISION, UNITED STATES STEEL CORPORATION
HEADQUARTERS: 208 So. LA SALLE ST., CHICAGO 4, ILL. WAREHOUSES AND SALES OFFICES:

BALTIMORE · BOSTON · CHICAGO · CLEVELAND · HOUSTON · LOS ANGELES · MILWAUKEE · MOLINE, ILL.
NEWARK · PITTSBURGH · PORTLAND, ORE. · ST. LOUIS · TWIN CITY (ST. PAUL) · SAN FRANCISCO · SEATTLE
Sales Offices: INDIANAPOLIS · KANSAS CITY, MO. · PHILADELPHIA · PHOENIX · ROCKFORD, ILL. · SALT LAKE CITY · SOUTH BEND · TOLEDO
TULSA · YOUNGSTOWN

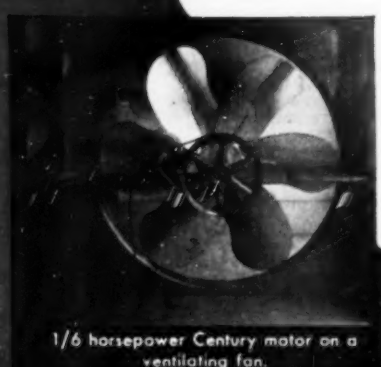
UNITED STATES STEEL

A Century fractional horsepower motor on an overhead blower in a National Guard Armory used to exhaust air from the firing line of rifle range.



Century fractional horsepower motor used on an overhead blower in the same Armory to exhaust air from a ticket office and men's wash room.

Century ½ horsepower capacitor motor on a furnace blower.



1/6 horsepower Century motor on a ventilating fan.

WHY Century MOTORIZED EQUIPMENT KEEPS YOUR CUSTOMERS *SATISFIED...*

The motor specifications—where skillfully selected—to assure the TOP PERFORMANCE and DEPENDABLE QUIET SERVICE that is built into each class of equipment.

Refrigeration compressors require one combination of operating characteristics and specifications—fans and blowers another combination—various types of heating equipment still another.

In over 50 years, Century has developed a wide line of types of motors with literally hundreds of specifications to choose from. It is easy to ENGINEER YOUR PRODUCT PERFORMANCE—THROUGH SKILLFUL MOTOR APPLICATION.

If you have motor service problems, phone or write to any of Century's 28 District offices regarding Century's national network of service stations—the motor exchange plan will serve you whether your motors are in or out of warranty.

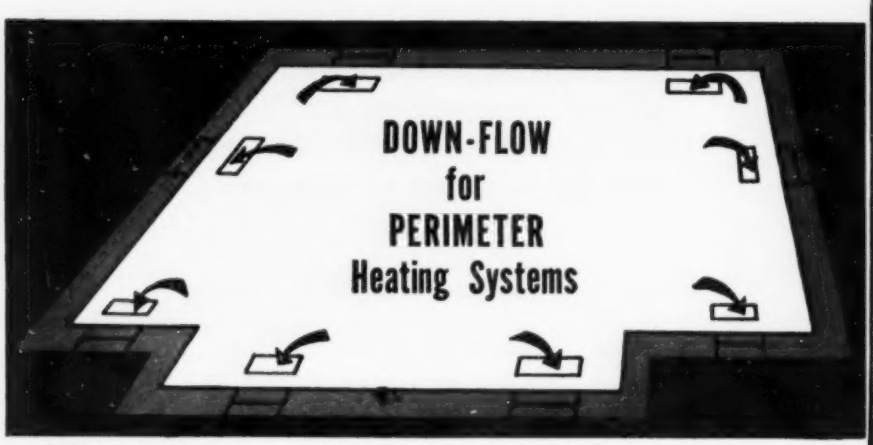
Specify Century Motorized Equipment—get top equipment performance—dependable quiet service—keep your customers satisfied.

CENTURY ELECTRIC CO
1806 Pine Street • St. L

Century C MOTORS

WINTER AIR CONDITIONING at its BEST!

Activated Heat WITH warm air NIAGARA FURNACES



GAS Model 40-80 DFAC DOWN-FLOW

OIL Model 30-90 DVAC HI-BOY

. . . and conventional "up-flow" Hi-Boys . . .

Long noted for dependable and efficient service—supplying maximum heat at minimum cost—Niagara furnaces are fast gaining fame also as maximum profit-makers for heating contractors.

The Niagara line, greatly enlarged to meet all modern residential heating requirements, now includes:

GAS } Basement and utility-room models . . . Down-Flow and conventional "up-flow" Hi-Boy units (steel) . . . also the famous Deluxe "Thrifty 50" with the exclusive, efficient Niagara cast-iron heat exchanger—forced air and gravity.

OIL } Down-Flow and conventional "up-flow" Hi-Boy models and basement-type forced-air and gravity units (steel).

COAL } Complete winter air conditioners and round and square gravity furnaces (cast-iron).

SIZES FOR LARGE, MEDIUM AND SMALL HOMES

For detailed information on the profit opportunity with Niagara, write:

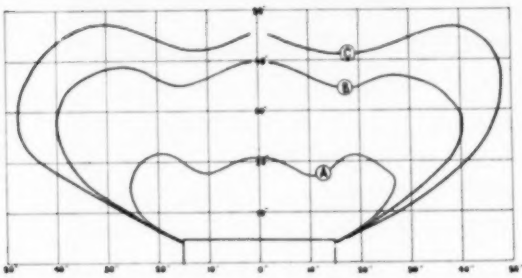
NIAGARA FURNACE DIVISION
The Forest City Foundries Company
2500 West 27th St., Cleveland 13, Ohio

NIAGARA is the word for MAXIMUM HEAT at MINIMUM COST

ENGINEERING DATA ON PERFORMANCE OF NEW TITUS PERIMETER DIFFUSER

FOR HEATING AND COOLING. Delivers air where it is most needed. Requires *one-half labor* and *one-half duct* work of ordinary installations. Fits any type warm or cool air installation. Need not be confined to perimeter jobs. Guaranteed quality. ELIMINATES FLOOR DRAFT AND COLD OUTSIDE WALLS. Makes home warmer in winter, cooler in summer.

ISO-VEL SHOWING AIR PATTERN OF TITUS NO. 100 PERIMETER DIFFUSER

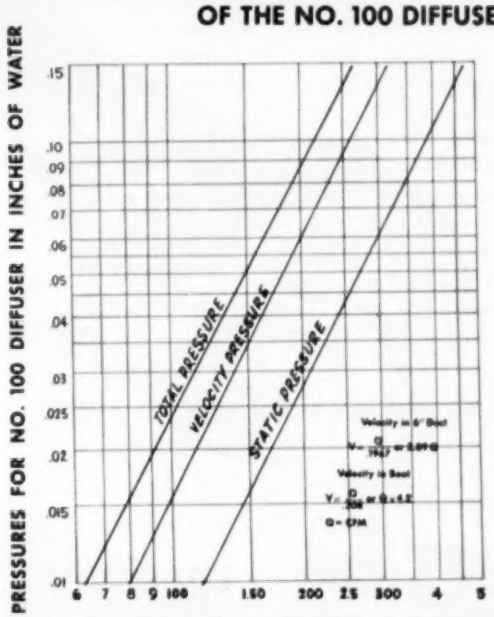


Pattern spread is important where higher diffuser velocities are used. Note how this diffuser gives an additional blanketing of the outside wall. The above iso-vels were taken at (A) 130 CFM; (B) 180 CFM; (C) 230 CFM. The patterns indicate all points at which a 200 FPM velocity reading occurred.

ENGINEERING DATA FOR TITUS NO. 100 PERIMETER DIFFUSER

					Register Temperature		
CFM	Static Press.	Velocity Press.	Total Press.	Throat Velocity	135° BTU Output	140° BTU Output	146° BTU Output
50	.0021	.0067	.0088	240	4000	4300	4600
60	.0029	.0075	.0104	288	4000	4300	4600
70	.0038	.0084	.0118	336	4480	5000	5400
80	.005	.010	.015	384	5320	5700	6150
90	.0065	.013	.0195	432	6000	6400	6900
100	.0075	.016	.0235	480	6670	7130	7700
110	.0095	.0159	.0254	529	7320	7850	8450
120	.0113	.023	.0343	576	8000	8500	9250
130	.0128	.0265	.0393	625	8680	9300	10000
140	.0148	.031	.045	672	9320	10000	10770
150	.0165	.035	.052	721	10000	10700	11520
160	.019	.040	.0515	769	10680	11400	12300
170	.021	.045	.066	816	11320	12100	13100
180	.023	.05	.073	865	12000	12850	13850
190	.025	.056	.081	913	12700	13550	14650
200	.028	.062	.090	960	13300	14270	15400
210	.031	.0682	.0992	1010	14000	15000	16180
220	.034	.0745	.1085	1055	14700	15700	16900
230	.035	.082	.117	1105	15400	16400	17590

CFM AND PRESSURE REQUIREMENTS OF THE NO. 100 DIFFUSER



Get facts now on the truly MODERN WAY TO DIFFUSE COOLED AND HEATED AIR. Get the jump on competition.

Request FREE Additional Information MAIL TODAY

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Rush me

- ☐ Booklet on Trends in Warm Air Heating
- ☐ Catalog on Perimeter Diffuser and Return Air Grilles
- ☐ How to Get "Quick Sales" Display Promotion Kit

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WORLD'S *most imitated* WRENCH

● CRESCENT is the original 15° angle adjustable wrench. Despite the fact that no other wrench has been so widely imitated, sales of CRESCENT and CRESTOLOY WRENCHES are approximately equal to sales of *all* competitive makes combined. The reason for this overwhelming preference is CRESCENT'S demonstrated quality and outstanding value . . . the result of untiring technological research and continuous product improvement.

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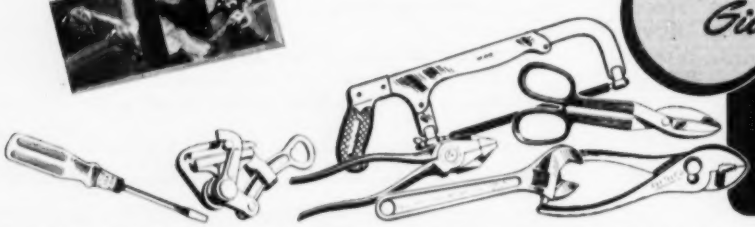
Has all the answers. It tells what tools to use and how to use them. Fully illustrated. A postcard will bring it to you. Send today.

CRESCENT TOOLS
Give Wings to Work
®
Sign of the Artisan
Symbol of Excellence



Crescent is our trade-mark, registered in the United States and abroad, for wrenches and other tools. Sold by leading distributors and retailers everywhere and made only by

CRESCENT TOOL COMPANY, JAMESTOWN, NEW YORK

your *profits* are higher when you sell

WEIR-MEYER

two more MEYER HI-BOYS

for your CUSTOMER'S CHOICE!

***10 furnaces in 1**

Updraft	Counterflow	type of burner
1.		GAS
2.		PRESSURE OIL
3.		VAPORIZING OIL
4.		COMB. GAS-OIL
5.		DUAL GAS
6.	7.	
8.	9.	
10.		

"Customer's Choice", not **"Dealer's Choice"**, is the game to play in today's market. Your customers get a complete selection—over 100 units—with the Weir-Meyer line! Two new Winter Air Conditioners, the B-11 and the B-13, round out the Weir-Meyer group of Hi-Boys. Their versatility—both are really *10 furnaces in 1**—makes them real sellers... and a sure bet to ease your inventory problem. Fit into less space than an easy chair—yet pack an incredible heating capacity (For gas: 105,000-160,000 Btu/hr input) (For oil: 120,000-168,000 Btu/hr @ bonnet). The secret is the exclusive D-shaped Thermatic Radiator, a "heat-trap" design *without* condensation pockets. Other famous Weir-Meyer features: All-steel, one-piece heating element — absolutely prevents fume leakage. Large filters. Over-size, rubber-mounted blower. SEND COUPON BELOW FOR FULL INFORMATION.

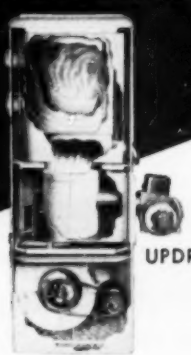
COUNTERFLOW

The MEYER Furnace Company

GENERAL OFFICES: PEORIA 2, ILLINOIS
FACTORIES: PEORIA AND PERU, ILLINOIS
Manufacturers of Weir & Meyer Furnaces
Air Conditioners for Gas—Oil—Coal

COUNTERFLOW OR UPDRAFT

The B-11 and B-13 are designed and built so that the same identical unit may be installed as (1) Counterflow or (2) Updraft Hi-Boy—whichever you prefer. You simply install the blower unit above or below the heating element.



UPDRAFT HI-BOY

MEYER FURNACE COMPANY, Dept. B-23 Peoria 2, Illinois
Gentlemen:
Please send me full details on the Meyer B-11 and B-13 furnaces... plus information on the complete Weir-Meyer line at no obligation.

Name.....

Address.....

City..... State.....

MORE PROFITABLE TO INSTALL

Thermo-Drip *Automatic* Humidifier

- ★ VALVES DON'T LIME UP
- ★ NO STAGNANT POOL TO REHEAT
- ★ SUPER-SENSITIVE THERMOSTAT
- ★ OUTSIDE SCREW ADJUSTER
- ★ EASY INSTALLATION
- ★ ONE KIT TO PURCHASE

OUR VOLUME SALES PROVE IT . . . THERMO-DRIP GIVES FURNACE OWNERS GREATER CUSTOMER SATISFACTION.

PROSPECTS EASILY SEE THE ADVANTAGES OF HUMIDIFYING BY AUTOMATICALLY DROPPING WATER ON A SIZZLING HOT STAINLESS STEEL PAN.

Too, it's easy to demonstrate why this method is the *most efficient, most dependable* way to put moisture in the air.

Yes—Thermo-Drip gives *faster, most efficient vaporization.*

Write today for FREE literature. Dept. A-23

AUTOMATIC HUMIDIFIER COMPANY
CEDAR FALLS, IOWA

If you are a responsible dealer...

YOU ARE INVITED TO SHARE IN THE INCREASING VOLUME AND PROFITS

being stimulated by

fluid heat
AUTOMATIC HEATING EQUIPMENT

NATIONAL ADVERTISING

MANY HOMEOWNERS IN YOUR SALES AREA ARE AMONG THE 7½ MILLION WHO READ ADS LIKE THESE MONTH AFTER MONTH

Many choice areas still available!

The phenomenal growth in popularity among American homeowners demands that we make the **FLUID HEAT** line available thru additional dealers who are established in their sales area.

Like all **FLUID HEAT** dealers, you will be supported month after month by powerful, hard-selling advertising in the nation's most-read-by-homeowners magazines: *Saturday Evening Post* and *Better Homes and Gardens*.

To make your selling still easier, **FLUID HEAT** enables you to offer, under one brand name, a complete line of both gas and oil-fired units . . . gas fired furnaces and conversion burners plus both rotary and pressure type oil fired conversion burners, furnaces and boilers . . . a unit for every home-heating need and budget. And, you will sell with confidence since every **FLUID HEAT** unit is backed by our over 30 years of heating-engineering experience, research and manufacturing.

If you would like to share in the new business being whipped up by this hard-hitting promotional program, write us today. Let us give you full details and discuss the advantages you would obtain in your area as an authorized **FLUID HEAT** dealer.

ANCHOR POST PRODUCTS, INCORPORATED
Fluid Heat Division
6900 Eastern Avenue • Baltimore 24, Maryland

THE ONLY *COMPLETE* LINE OF OIL AND GAS-FIRED FURNACES, BOILERS, CONVERSION BURNERS

OIL-FIRED UNITS
Famous Fluid Heat Pressure Burners. Four models, with firing rates from 7/10 to 12 gallons per hour.
Famous Fluid Heat Boiler Burner Units. Six models, rates from 300 to 1090 sq. ft. of standing steam.
Famous Fluid Heat Wall Flame Rotary Burner. Two models with firing rates from ½ to 4½ gallons per hour.
Famous Fluid Heat Warm Air Furnaces. Seven models, from 70,000 to 335,000 B.T.U. per hour.
GAS-FIRED UNITS
New Fluid Heat Gas-Fired Warm Air Furnaces with rated inputs of 70,000 to 140,000 B.T.U. per hour.
Single-port, self-piloting Fluid Heat Gas Conversion Burners. Rated inputs of 75,000 to 300,000 B.T.U. per hour.

4 powerful reasons why you get more of what you want in 1953 CHEVROLET Advance-Design Trucks

MORE TRUCK FOR LESS MONEY! Chevrolet trucks list for less than any others of comparable specifications. Yet they bring you features and advantages found in few other trucks. For example, the advanced Loadmaster engine—standard in 5000 and 6000 Series heavy-duty and forward-control models (optional on 4000 Series heavy-duty trucks)—now has a new high-compression ratio of 7.1 to 1, and delivers even more horsepower than before.

FACTORY MATCHED TO YOUR JOB! Every unit of the Chevrolet truck you buy is balanced to the job. Tires, axles, springs, engine, frame, body and brakes form a team carefully engineered for the greatest efficiency—and the lowest cost.

GREATER VALUE IN FEATURE AFTER FEATURE! Two great valve-in-head engines—the Thriftmaster and the Loadmaster—provide greater gasoline economy. Hypoid Rear Axle, Unit-Designed Bodies, Flexi-Mounted Cabs and many other Advance-Design features offer value unmatched by any other truck at such low cost.

MORE RUGGED THAN EVER! In 1953, Chevrolet trucks are even sturdier. Bigger, more durable brakes on many models; heavier, more rigid frames and stronger construction lengthens truck life and lowers your hauling costs. See your Chevrolet dealer. Chevrolet Division of General Motors, Detroit 2, Michigan.

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—the Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load. **POWER-JET CARBURETOR**—for smooth, quick acceleration response. **DIAPHRAGM SPRING CLUTCH**—for easy-action engagement. **SYNCHRO-MESH TRANSMISSION**—for fast, smooth shifting. **HYPOID REAR AXLE**—for dependability and long life. **TORQUE-ACTION BRAKES**—on light-duty and medium-duty models and on front of heavy-duty models. **TWIN-ACTION REAR BRAKES**—on heavy-duty models. **DUAL-SHOE PARKING BRAKE**—for greater holding ability on heavy-duty models. **CAB SEAT**—with double deck springs for complete riding comfort. **VENTI-PANES**—for improved cab ventilation. **WIDE-BASE WHEELS**—for increased tire mileage. **BALL-GEAR STEERING**—for easier handling. **UNIT-DESIGNED BODIES**—for greater load protection. **ADVANCE-DESIGN STYLING**—for increased comfort and modern appearance.

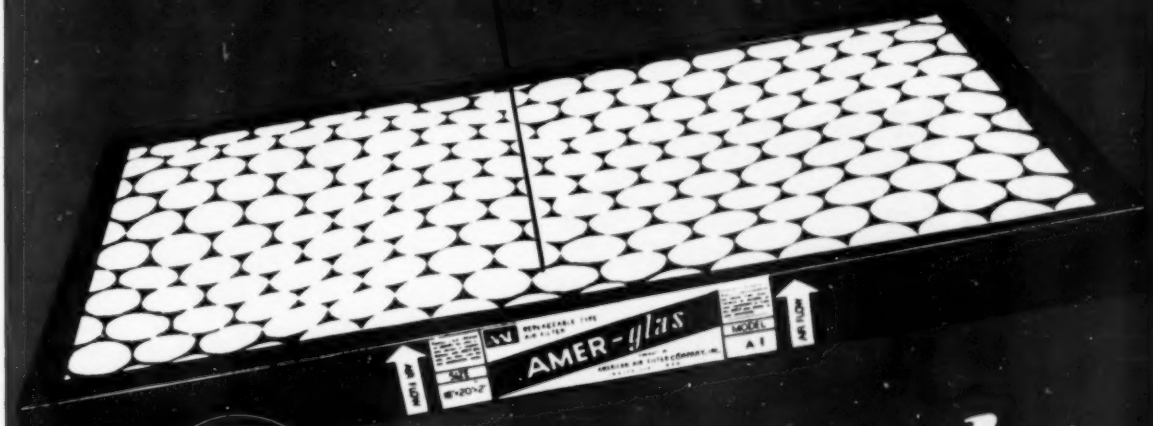
CHEVROLET

first in demand in value in sales

BECAUSE THEY'RE WHITE...

YOUR FUTURE IS BRIGHT!

STOCK . . . SELL . . . DISPLAY...



The HOSPITAL WHITE Filter

®AMER-glas FURNACE FILTERS

Sell the filter you can display with pride, the 'hospital-white' filter that catches the customer's eye (but leaves no prickly fibers in his fingers!).

Tested AMER-*glas* merchandising and advertising has customers 'filter-minded'. Be ready . . . stock, display and sell AMER-*glas* filters during this big selling season. They're WHITE and RIGHT for impulse sales!

AAF

An Engineered product of

American Air Filter

COMPANY, INC.

MAIL TODAY

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335 Central Ave., Louisville 8, Ky.

Please send me complete information about free AMER-glas selling aids.

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COMPANY_____

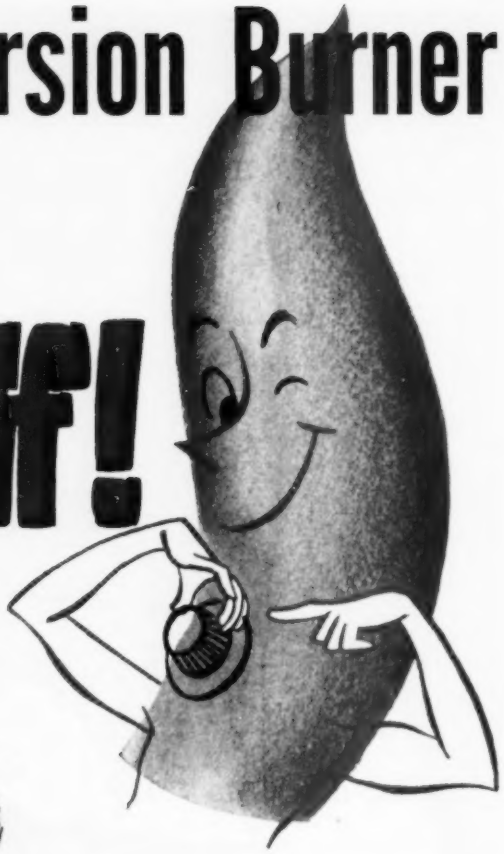
ADDRESS_____

CITY_____ ZONE___ STATE_____

The ONLY Conversion Burner

with the flame that

tunes itself!



Here's the only gas conversion burner with flame modulation! It's the A. O Smith Model 205 with "Magic-Heet" Control.

With it you can offer unvarying heating comfort ... no more annoying "on-and-off" cycles ... just steady heat for which every furnace and boiler was originally designed.

Exclusive "Magic Heet" Control senses variations in the temperature of return air in warm air systems or return water in forced-flow hot water systems. Immediately it tunes the flame to meet temperature changes.

And this gas conversion burner comes complete . . in one package. Easy to handle, stock, deliver ... and install.

For complete information, contact the nearest A. O. Smith district office listed below, or write: A. O. Smith Corporation, Permaglas-Heating Division, Dept. AA-253, Kankakee, Illinois.

Model 205 DeLuxe Gas Conversion Burner, will fit most residential installations.

Other A. O. Smith gas conversion burners include: the Model 201 with monoport type burner and the Model 350 which takes care of all your requirements up to 345,000 B.T.U. input.

Manufacturers also of:
Warm Air Furnaces, Home Heating Boilers, Permaglas Automatic Water Heaters, Commercial Water Heaters.

A.O.Smith

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SERVICE: Chicago 17 • Dallas 1 • Los Angeles 12 • Union, N. J.
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Auer's complete line includes...

registers for PERIMETER HEATING and OUT-OF-WALL INSTALLATIONS

Here are two more good reasons why it pays to deal with the Auer Register Company for *all* your register needs. *PERIMETER* and OUT-OF-WALL base board registers and grilles are available —built to Auer's high standards of uniform quality and accurate dimensions . . . in standard sizes to meet Code requirements.

PERIMETER HEATING REGISTERS

See illustrations and captions at right—

Auer DRP Perimeter Register

Available in widths for 4 and 6-inch openings and in standard 10, 12 and 14-inch lengths. Sturdy cross-locked bar construction — extra strong. Cross bars are adjustable 45° in either direction. Valve opening can be held at proper setting for balancing system. Adjustment does not prevent closing of valve.

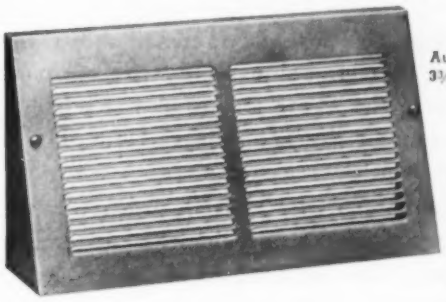
OUT-OF-WALL REGISTERS

For out-of-wall installations where no stud space is available for ducts, or where wall space is insufficient for wall type registers. Register is equipped with a single-shutter valve easily operated by a control lever located at top center. Both register and intake have 3¾" base flange projection. They are adaptable to old or new homes, and suitable for perimeter heating under certain installation conditions. Standard setting of flexible fins 22½° downward.

Auer DRP (2¼") Perimeter Register

New design for narrow space requirements. One size only, 14" long. Cross bars and valve are adjustable as in other widths. Ideal for small space requirements such as under kitchen cabinets, on stair risers, etc. . . . in addition to perimeter heating.

Auer No. 7042-3¾ Base board Register



Auer No. 7043-3¾ Base board Intake

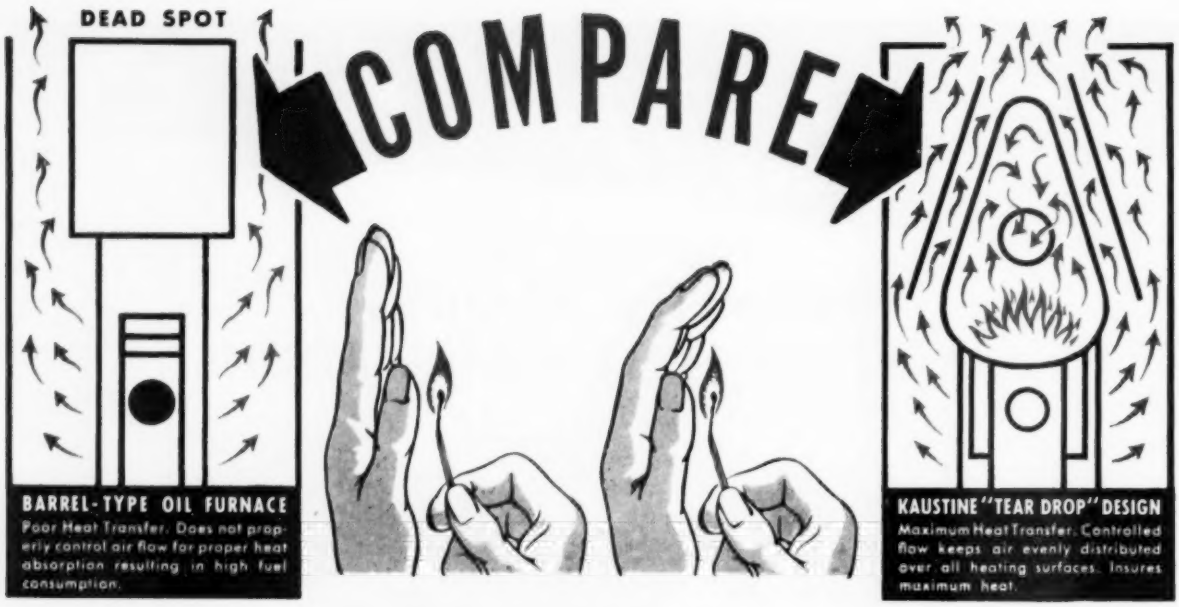
Auer also makes the famous "Streamliner" registers and grilles for high-velocity air-conditioning systems, as well as perforated grilles and registers for all types of ventilating and heating systems.

Write for your copy of the *Auer Register Book* containing 30 pages of useful information.

Auer REGISTERS and GRILLES

THE AUER REGISTER CO. 6600 CLEMENT AVE. • CLEVELAND 5, OHIO

Canadian Distributer—Marchand Furnace Ltd., Tilbury, Ont.


DEAD SPOT
COMPARE
BARREL-TYPE OIL FURNACE
Poor Heat Transfer. Does not properly control air flow for proper heat absorption resulting in high fuel consumption.
KAUSTINE "TEAR DROP" DESIGN
Maximum Heat Transfer. Controlled flow keeps air evenly distributed over all heating surfaces. Insures maximum heat.

MAKE OUR MATCH TEST

...PROVE TO YOURSELF THE EFFICIENCY OF

KAUSTINE "TEAR DROP" DESIGN

● Kaustine Oil Fired Furnaces are ENGINEERED to deliver maximum heat with a minimum of fuel consumption. This is accomplished by Kaustine's unique "TEAR DROP" Heat Exchanger Systems.

Basically this phenomenal ability to develop quick, even heat is achieved by the *controlled* course of air around the "Tear Drop" Heat Exchanger, the Radiation Sheets and the Economizer Unit. The latter utilizes the heat from stack gases.

Remember too... that Kaustine's reputation for quality is unsurpassed and their prices are competitive.

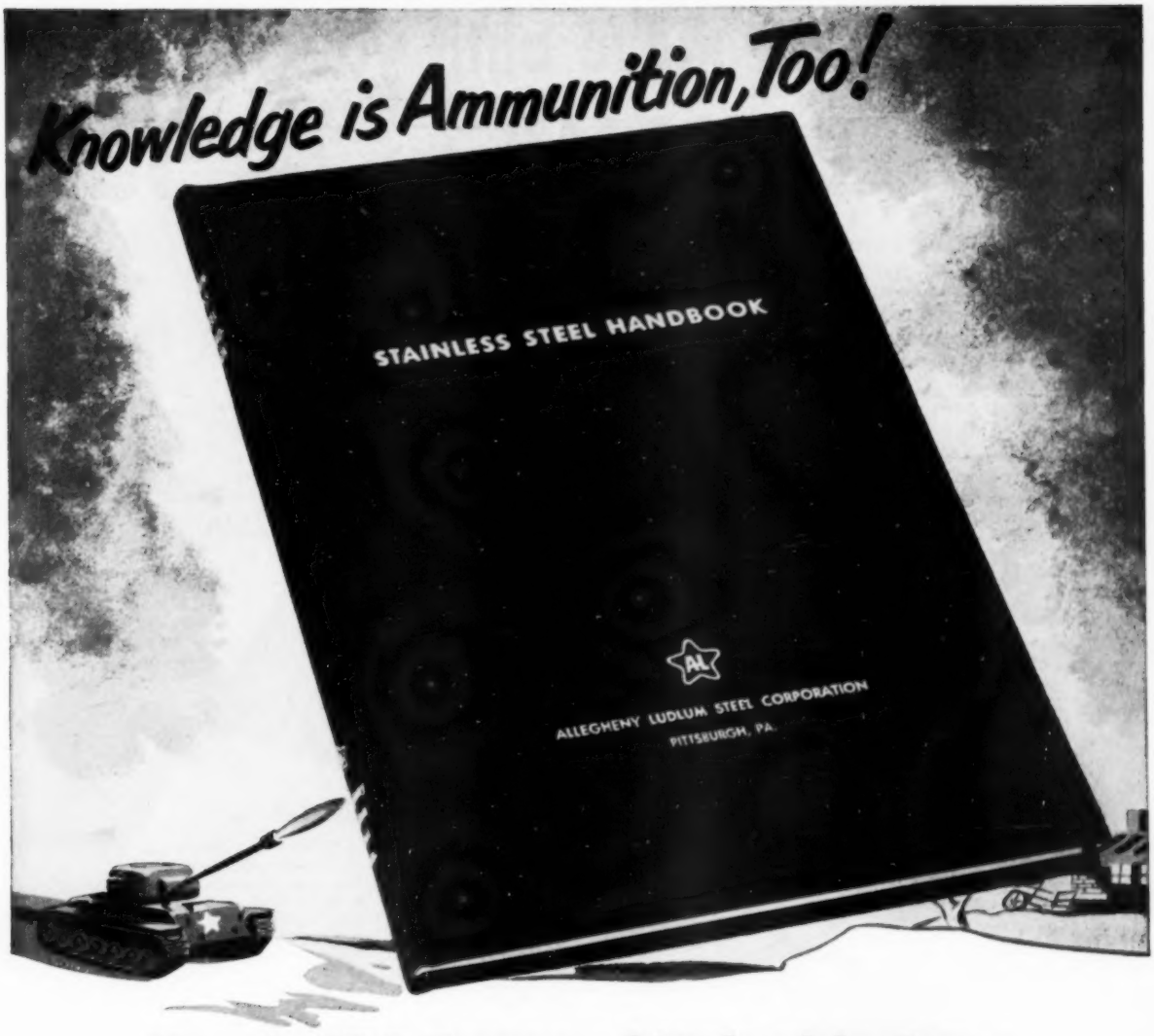
Write for full information to Dept. A-2

There is a Kaustine Furnace or Winter Air Conditioner for every type of home.

THE POPULAR JERSEY "75"

The OIL FIRED HIGH BOY Jersey "75" Automatic Forced Warm Air Furnace. Requires only 3½ square feet of floor space. 75,000 B.T.U.'s. Chrome steel fire pot liner. Fully automatic controls. Shipped ready to install. Weight 324 lbs.

Kaustine



Here's 124 Pages of Valuable Data on STAINLESS STEEL

Stainless steel is a critical rearmament material. As the nation's mobilization program shifts into higher speed, supplies of this vital alloy are becoming increasingly restricted. If you're using stainless, be sure you make every pound go as far as possible.

Allegheny Ludlum's new 124-page, case-bound Stainless Steel Handbook is ready for distribution now. It will help you to select the right stainless steel and to use it right. Comprehensive listings of analysis, properties and characteristics of each type will guide you in specifying grades that will do your job most efficiently. Clear, concise fabrication data will help you speed production and cut waste.

Your copy of the Stainless Steel Handbook will be sent—*without charge*—upon request. Our only stipulation: please make your request upon your company letterhead. ● Write Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.

ADDRESS DEPT. AA-38

WSD 3947

Remember this also
America must have more Scrap to make more Steel!
Get in the Scrap Now!

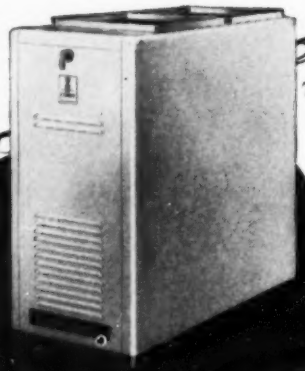
You can make it **BETTER** with

Allegheny Metal

AL
TIME-TESTED STAINLESS STEEL

Don't make a move until you see the GAS ECONOMY® line for '53!

It's the line designed with YOU in mind! This beautiful, new Economy® line has many outstanding features that make *your* selling and installation *easier* and more profitable — features that assure top performance, satisfaction and value for your customers! There's a Gas Economy unit for *every* need — complete winter air conditioners or gravity types — assembled or not assembled. And every unit is International-engineered for the fuel your customer wants to use — to deliver maximum heating efficiency, utmost economy, and *years* of trouble-free service.



Gas Lo-Boys

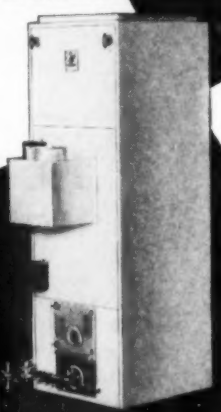
TEN Gas Lo-Boy models—ranging from 70,000 Btu to 210,000 Btu input—beautifully styled cabinets with rounded corners—six models shipped factory-assembled, four models shipped not assembled. AGA approved with safety controls, removable pilot burner assembly.

Gas Hi-Boys

SEVEN Gas Hi-Boy models, from 65,000 Btu to 110,000 Btu input — with choice of exposed or enclosed controls. Pilot burner assembly easily removed (even while hot) for service or adjustment. All models shipped completely assembled for quicker, easier installation. AGA approved—with all safety controls. Complete winter air conditioning for the average home — at modest cost!

Gas Counterflo

AGA approved for extra-close clearances in closet or utility room installations—ideal for perimeter heating jobs. Only 1 in. clearance on sides, 2 in. on back and 16 in. on front required for safety. Shipped completely assembled — a compact unit that has big-profit possibilities in the modern basementless home.



Gas Gravity

FOUR Gas Gravity models, ratings from 70,000 Btu to 147,000 Btu. Low in first cost . . . low in operating costs—these dependable Economy units offer your customers all the comfort and convenience of gas heat at *real* savings. Fully approved by AGA. Two models shipped assembled—others shipped not assembled.

P.S. There's an International Economy gas conversion burner, oil or coal unit for any need, too!

See your distributor for full details, or write

International heater co.
utica 2, n. y.

Western Office and Warehouse, 1933 Wentworth Ave., Chicago 16, Ill.

YOU CAN GET STARTED WITH Stainless NOW!

No trick to soldering ENDURO *Stainless Steel. Use a large iron, heat it slightly more than usual. That's all.*

After soldering, wash off all flux immediately. Use a 5% to 10% solution of washing soda and water.

There's no need for you to pass up those high-profit stainless steel roof drainage jobs you've been hearing about. Berger Roof Drainage Products made of Republic ENDURO Stainless Steel are *easy to hang.*

Your usual tools and equipment . . . your own knowledge and experience fill the bill. Nothing else required.

For an all-around, stronger, more attractive, corrosion-resistant drainage system, figure on using all-ENDURO fittings and accessories, too.

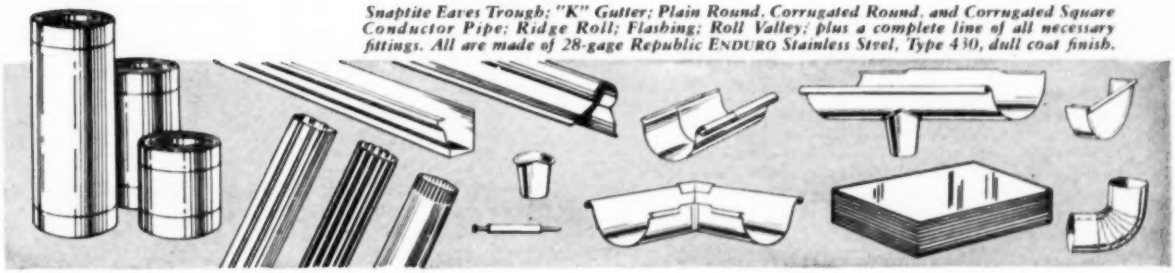
Jobs are waiting . . . and demand is expanding rapidly as home owners learn all the advantages of stainless steel. Jobbers in most areas have stocks of ready-to-use Berger ENDURO Stainless Steel Roof Drainage Products. Get started with stainless now.

BERGER MANUFACTURING DIVISION
REPUBLIC STEEL CORPORATION
1010 BELDEN AVENUE • CANTON 5, OHIO

BERGER
STAINLESS STEEL ROOF DRAINAGE PRODUCTS

REPUBLIC STEEL

Snaptite Eaves Trough; "K" Gutter; Plain Round, Corrugated Round, and Corrugated Square Conductor Pipe; Ridge Roll; Flashing; Roll Valley; plus a complete line of all necessary fittings. All are made of 28-gage Republic ENDURO *Stainless Steel, Type 430, dull coat finish.*



ARMSTRONG

helps you haul 'em in

You make money when you sell Armstrong furnaces.

The Armstrong dealer franchise is a profit-package . . . built to help the dealer . . . to help you make sales . . . to help you make ***profit.***

It's centered around a line of furnaces you can be proud to sell. A full, wide line of them. Oil, gas and coal. A model to fit the needs of every prospect.

Priced so you can sell against competition without shaving your profit. Made to install easily, quickly, so you don't lose your profit on installation troubles. Built to operate dependably, so service calls don't eat up profit.

But Armstrong goes farther than that. National advertising to open up the minds of your prospects. Folders, direct-mail, newspaper ads and special campaigns to help you pull them to ***you.*** Store display materials to help close them.

And a big inventory, close at hand, at your command.

If you want volume ***at a profit,*** check on the Armstrong ***profit-package.*** Your nearby Armstrong wholesaler has facts and figures for you. Get in touch with him now, or drop us a line for his name.

Make sales, but ***make a profit.***

Wherever you are

YOU'RE ON THE ARMSTRONG MAP
. . . *IN A STRATEGIC LOCATION*

Armstrong's two huge plants serve both sides of the continent quickly, economically. A warehousing distributor, with a complete Armstrong inventory, is within a stone's throw of everywhere. Wherever you are, Armstrong's distribution system is set up to serve you. It's better, quicker, more profitable . . . for you.

Please address Dept. AA at our plant nearest you.

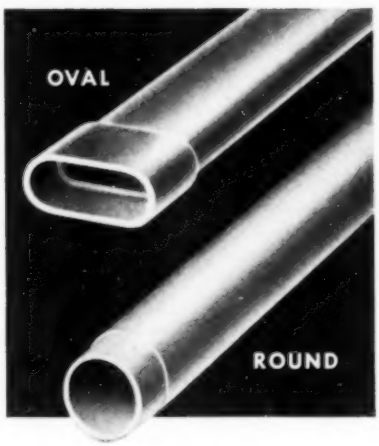
ARMSTRONG
FURNACE COMPANY

COLUMBUS, OHIO — DES MOINES, IOWA

Warm-Air Furnaces—Gas, Oil, Coal—A Complete Line

"Did you say 60,000,000 ft.?"

"No . . . I said 65,000,000 ft. of Transite Flue Pipe now in service!"



IF YOU WANT TO KNOW the reasons why Transite Flue Pipe is such a nationwide favorite, ask the men who install it!

They like the way this easy-to-handle asbestos-cement pipe saves time – and headaches – on the job. No crimping, no hole punching, no special tools needed here . . . no bolts or nuts for making joints.

They swear by – not at – the tapered couplings that require only a drive fit to assure quick, positive alignment.

They like Transite's *complete* line of fittings, too – because they provide the answer to any job requirement . . . make it easy to follow good venting practice.

And they've learned from experience that this is one flue pipe that won't deform, dent or bend out of shape. They specially like the firm, solid, rigid type of installation they know they can count on with Transite Flue Pipe – every time!

Once you've tried Transite Flue Pipe, you too, will be sold on its many practical advantages that mean more profitable gas venting jobs for you – and long term satisfaction for your customers. For further details, write Johns-Manville, Box60, New York 16, N. Y.

Transite Flue Pipe is the only flue pipe for gas appliances listed by Underwriters' Laboratories that has been continuously approved since 1932.

Johns-Manville TRANSITE FLUE PIPE

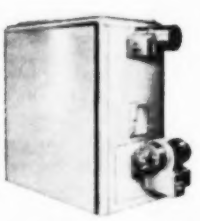
FOR VENTING DOMESTIC GAS-BURNING APPLIANCES

DELCO-HEAT offers you the greatest array of self-selling features in the heating business

No gadgets, no claims that sound good and mean nothing. Each and every Delco-Heat feature is General Motors engineered to guarantee honest benefits in fuel savings, reserve heating power, and long, trouble-free service. ALL Delco-Heat advertising spells out these benefits in terms your potential customers can understand to help you move more heating units at bigger profits. And look at all these other reasons why Delco-Heat is the most valuable franchise ever offered.

- Complete line of Conditionairs, boilers and burners
- Packaged units for quick, easy, low-cost installation
- Exclusive synchronized controls
- Full-scale sales and application engineering training
- Giant sales-winning national and local advertising program to bring customers in—ready to buy

Get the facts about the new franchise territories available now. Write Delco Appliance Division of General Motors, Dept. AA, Rochester 1, N. Y.



DELUXE CONDITIONAIR MODEL OPC-LD

Ideal for basement installations or wherever space is limited. Furnace section, blower filter, in single wrap-around unit.

COUNTERFLOW CONDITIONAIR MODEL OPC-HR

Leader in new trend . . . features downward movement of air over heat transfer unit. Ideal for perimeter type systems in ranch homes.

In addition to the two CPC series Conditionairs illustrated, there is the Model OPC-75H which is designed especially for utility room, closet or alcove installations.

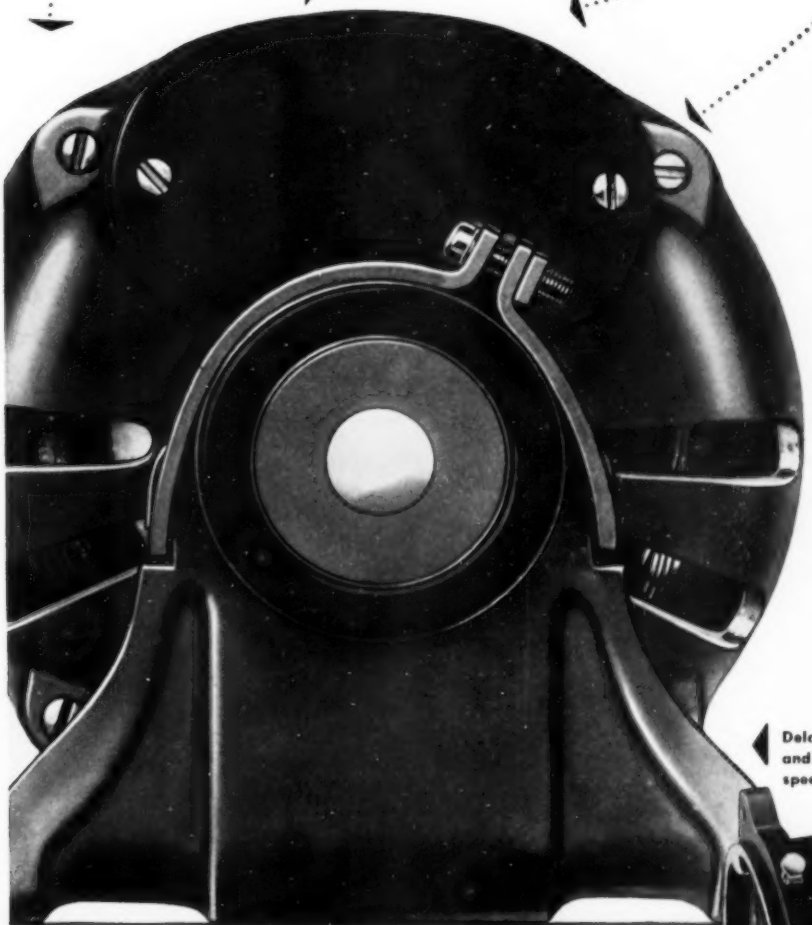
For a good deal—DEAL WITH DELCO

GENERAL MOTORS DELCO-HEAT

. . . a complete line of automatic oil and gas-fired conversion burners, Conditionair forced warm air furnaces, boilers, water heaters and electric water systems.

Engineered for ENDURANCE

Delco Motors



THE BEST RUNNING MATE YOUR PRODUCT CAN HAVE

The unsurpassed record for long, dependable service that has been established by Delco motors is recognized by leading manufacturers of heating and ventilating equipment everywhere. Because Delco motors deliver continuous trouble-free service far longer than ordinary motors, more and more manufacturers demand Delco when dependability is a must.

Critical selection of materials and careful dynamic balance—plus special features such as uniflow pressure-cast rotor conductors, steel backed tin babbitt sleeve, cored oil wells, varnish-dipped and baked motor windings—make Delco motors the right motors for your product.

You will find the motors you need, in sizes from fractional to 100 h. p., in the great Delco line. For information on motors for any application, address Delco Products, Dayton 24, Ohio, or our nearest sales office.

MOTORS FOR BLOWERS

Delco resilient-mounted motors, split-phase and capacitor-start types, single- and two-speed designs—1/6- to 3/4-h.p. ratings.

MOTORS FOR OIL BURNERS

Delco flange-mounted motors, split-phase 1/6- to 1/4-h.p. ratings.

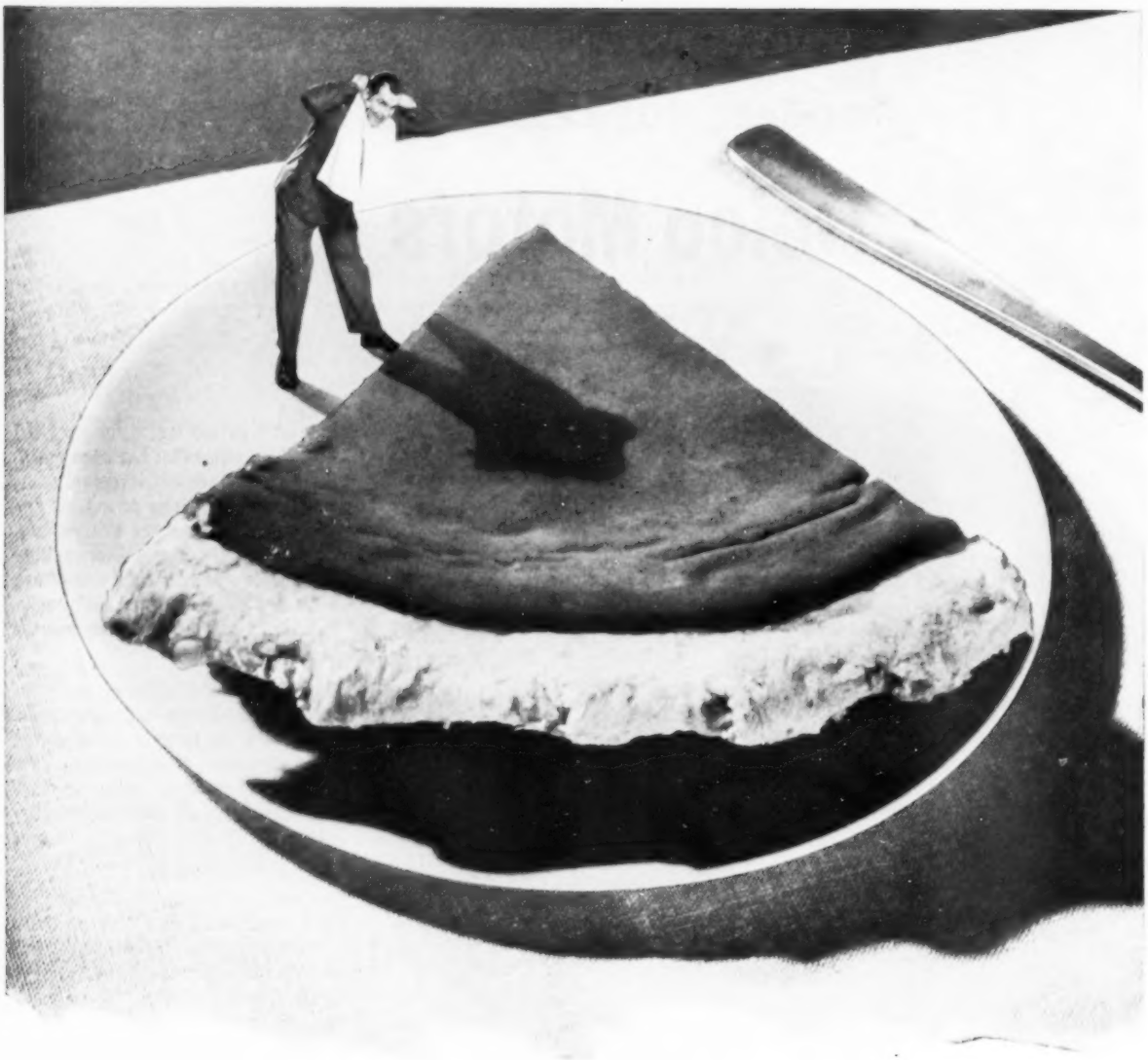
DELCO DAYTON OHIO

DELCO PRODUCTS

Division of General Motors Corporation • Dayton, Ohio

SALES OFFICES:

ATLANTA • CHICAGO • CINCINNATI • CLEVELAND • DALLAS
DETROIT • HARTFORD • PHILADELPHIA • ST. LOUIS • SAN FRANCISCO



YOUR SLICE WON'T SHRINK!

● We may be old-fashioned but we still believe our jobbers and dealers are entitled to a whole piece of business pie . . . without having it nibbled away by factory or cut-rate competition. We protect our outlets.

Perfection has the products, too, all competitively priced! The complete line of gas or oil-fired furnaces features the only *real exclusives* in the heating business . . . the amazing Regulaire* control and the fuel-saving 3-stage fire.

Add the stability that comes from 65 years of doing business and you've got a real deal. Result: *your* slice of the heating business will *grow* not shrink. We've still some room for smart, aggressive jobbers and dealers. Write us. PERFECTION STOVE COMPANY, 7403-A PLATT AVE., CLEVELAND 4, OHIO.

Perfection's 3 point platform for dealers

65 YEARS OF FINE PRODUCTS

Perfection

*Patents Pending

THE WINTER AIR CONDITIONER WITH THE

Flame that Tunes Itself

Here's the only furnace on the market with a modulating burner... a burner that tunes its flame continuously to the slightest change in return-air temperature.

Three exclusive components make this possible, to provide "LIVING-LEVEL" HEATING. 1) *"Magic-Heet" Control* accurately measures the rate of heat loss and continuously adjusts gas input. 2) *Modu-flame Burner* provides the exact amount of heat required. 3) *Duo-Level Blower Control* varies filtered air flow with heat input. These provide the CONTINUOUS COMFORT every homeowner desires.

For full information, write A. O. Smith Corporation, Permaglas-Heating Division, Dept. AA-253, Kankakee, Illinois.

Self Modulating

A. O. SMITH WINTER AIR CONDITIONER

High-Boy and Low-Boy Models 100,000 B.T.U. input are approved by AGA for modulation.

A. O. Smith also manufactures. Home-Heating Boilers • Gas Conversion Burners • Commercial Water Heaters, and the famous Permaglas Automatic Water Heaters.

A.O.Smith

PERMAGLAS-HEATING PRODUCTS

SALES: Atlanta • Chicago 4 • Dallas 2 • Denver 2 • Detroit 21 Houston 21 • Los Angeles 22 • Midland 5, Texas • Milwaukee 8 New York 17 • Philadelphia 3 • Pittsburgh 19 • San Francisco 4 Seattle 1 • Springfield, Mass. • Washington 6, D.C.
SERVICE: Chicago 17 • Dallas 1 • Los Angeles 12 • Union, N. J.
International Division: Milwaukee 1
In Canada: John Inglis Co., Ltd., Toronto

EQUIPMENT DEVELOPMENTS

The latest information on manufacturers' developments is presented here with brief summaries of the applications of these products. For new literature giving product information which is available see page 126.

Year 'Round Conditioners

NEW LINE of residential year 'round air conditioning equipment in a range of over 190 models — General Electric Corp., Bloomfield, N.J. The conditioners are self-contained, packaged units, gas or oil-fired. The smallest unit takes up 8.3 sq ft of

floor space, and the largest, 15 sq ft. Each model has a factory-sealed refrigeration system based on a newly developed hermetic compressor. The conditioners automatically cool when it is hot, dehumidify when it is muggy, and heat when it is cold; they also filter and circulate the air. Master thermostats control the temperature. AA 1

Humidifier for Furnaces

HUMIDIFIER for use in warm air furnaces — Walton Laboratories, Inc., Irvington, N.J. Features include evaporating capacity of over 3 gal per day, automatic hookup to water supply and possible connection to a humidistat control. AA 2

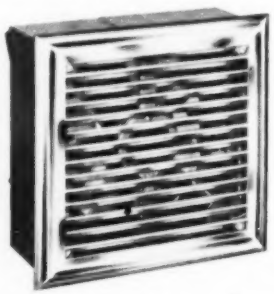
Wind Powered Ventilator

EASY-FLOW turbine wind powered ventilator, designed for commercial buildings, industrial plants, garages, etc., constructed with interior suspension shaft mounting designed to eliminate interference with operation by

ice, snow, dust, etc. — Greenheck Bros. Mfg. Co., Schofield, Wis. Wind direction is not a factor in its performance. It is equipped with radial thrust bearings in the base and the bearings are oil sealed. The ventilator is available in sizes from 6 to 30 in., with exhaust of 14,100 to 230,000 cfh. AA 3

Wall Fans

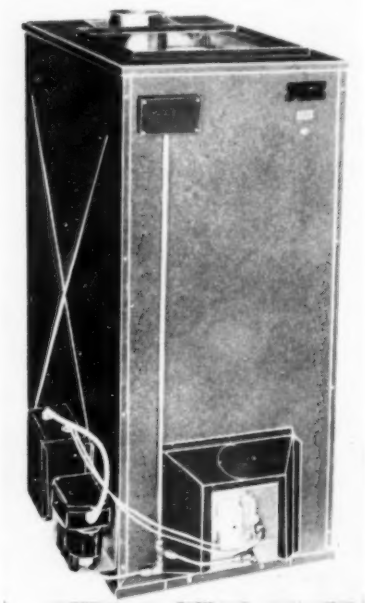
MOTORDOR WALL FANS in two new models: Model 11, with 10 in. diameter, and Model 80, with 12 in. diam-



eter — Broan Mfg. Co., Inc., Milwaukee. The insulated, motorized door is operated by a remote control switch which actuates a reduction gear mechanism, opening the door as the fan starts. It remains tightly closed, keeping drafts, etc., outside and eliminating damper rattle when the fan is not in use. The fans have a new chrome plated or white enamel finish, and an adjustable wall sleeve for varying wall thickness. The No. 11 fan moves 600 cfm, the No. 80, 900 cfm. Both have 115 volt, 60 cycle, a-c motors. AA 4

Warm Air Gravity Furnaces

THERMOSTAT-CONTROLLED warm air gravity furnaces which are equipped for operation during power failure —H. C. Little Burner Co., Inc., San Rafael, Calif. The oil-fired electric ignition gravity furnaces are now equipped with a special emergency control so that the owner can convert the unit to hand operation.



When electric current is restored, the unit automatically reverts to thermostat control. The gas-fired gravity furnaces are available with self-energizing controls which require no outside electrical connection. The oil-fired furnaces are available in a range of sizes from 60,000 to 105,000 Btu output and the gas-fired units from 60,000 to 120,000 Btu input. AA 5

Gas-Fired Incinerator

AUTOMATIC GAS-FIRED home model incinerator incorporating air-jet combustion with a rustproof, burnproof

refractory tile lining — Cole Hot Blast Mfg. Co., Chicago. The air jets are cast in the lining, placed at various levels of the burning chamber and slanted down into the chamber. They supply heated oxygen for complete combustion at every level. The unit will burn anything combustible, including wet garbage.. Since the air supply does not come through a grate at the bottom, the unit is clog-proof, the manufacturer states. AA 6

Room Air Conditioner

NEW ¾ TON window type air conditioner with cabinet front comprising a perforated metal grille and mahogany-tone plastic louver bands — Viking Air Conditioning Corp., Cleveland. Two-way cooling control permits full cooling during the day and mild cooling at night; refrigeration control permits shutting off of refrigeration while the unit operates as a fan; and directional control permits cool air to be directed up or down at any angle, the manufacturer states. For installation, the unit slides into a support frame. The filter can be removed from the unit without disassembly. The unit is designed for rooms up to 500 sq ft in area, under average operating conditions. It operates with a 110 volt, 60 cycle, single-phase ¾ hp a-c motor. It is intended to fit any window from 30 to 48 in. wide, filler panels being provided to close in the larger windows. AA 7

Counterflow Unit

RANCHIEF COUNTERFLOW unit for perimeter installations — Conco Engineering Works, Mendota, Ill. It features increased blower capacity for quieter operation and the veloc-

ity needed to force warm air through extended perimeter duct systems. Rating is 70,000 Btu, pressure oil, vaporizing oil, or gas-fired. It is convertible from oil to gas at any time without loss in capacity, the company states. All models are UL listed for close clearance installations. The new model can be installed in utility room or closet, because of the top flue outlet. AA 8

(Please turn to page 112)

This coupon is for your convenience in obtaining more information about any of the equipment mentioned in this issue. Keep your record of sources of supply up to date by adding the new products and companies listed here to your January 1953 AMERICAN ARTISAN annual directory section.

FOR YOUR CONVENIENCE 2-53

American Artisan
6 N. Michigan Ave., Chicago 2, Ill.

Please ask the manufacturers to send me full particulars about the equipment mentioned under the following reference numbers in Equipment Developments

(Circle each number in which you are interested)

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31									

Name ..... **Title** .....

Company .....

Address .....

City ..... **Zone** ..... **State** .....

TYPE 430 *doesn't tell its age*

which is new ?

which is old ?

Here are unretouched photos of two Type 430 stainless steel installations. The one on the right is 25 years old. It shows the back counter of the cafeteria in the Montreal offices of the Bell Telephone Co. of Canada. The installation on the left, completed in 1952, is in the People's Drug Store in Washington, D. C.

This is good evidence that Type 430 will do the job in restaurants and cafeterias. It's worth remembering because the chromium-nickel grades like Armco 18-8, Type 302, may be under restrictions for a long time.

Nearly every hotel, restaurant and cafeteria in your town is a prospect for some new custom-built stainless steel kitchen and serving equipment. This business is waiting for you. Why not get your share by calling on these good prospects? Tell them what you can do. Point out that Armco 17, Type 430 Stainless Steel is readily available—and completely satisfactory for this kind of work.

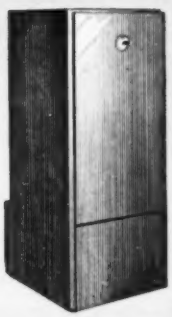
Your Armco Distributor has Type 430 sheets in stock, ready for quick delivery. He has Armco booklets on fabrication and other technical information waiting for you. Call on him for what you need.

Armco Steel Corporation

1593 Curtis Street, Middletown, Ohio • Distributors and Sales Offices from Coast to Coast • Export: The Armco International Corporation

ARMCO

Get into a Profitable Business Now!



Gas or Oil-Fired Winter Air Conditioners—Hi-Boys

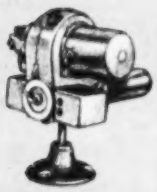
Gas or Oil-Fired Winter Air Conditioners—Lo-Boys

As a Chrysler Airtemp Authorized Dealer, you have your best opportunity for year 'round profits. Here's why:

- Your selling job is easier because people have confidence in the quality of Chrysler Airtemp products.
- Consistent national advertising tells the benefits of modern heating and air conditioning to your prospects. It creates a demand for Chrysler Airtemp products—makes your selling job easier.
- You can make extra profits selling Chrysler Airtemp cooling with your heating jobs.

Get the facts today. See what a profitable business is waiting for you!

Mail the coupon for full details.



Focused-Flame Oil Burners

Year-'Round Air Conditioners

Chrysler Airtemp

Comfort Zone

HEATING • AIR CONDITIONING FOR HOME, BUSINESS, INDUSTRY

AIRTEMP DIVISION OF CHRYSLER CORPORATION
DAYTON 1, OHIO

Airtemp Division, Chrysler Corporation
P.O. Box 1037, Dayton 1, Ohio

AA-2-53

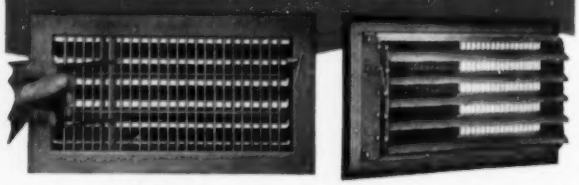
I would like to know more about Chrysler Airtemp's franchise arrangements.

Name_____

Address_____ Phone_____

City_____ Zone_____ State_____

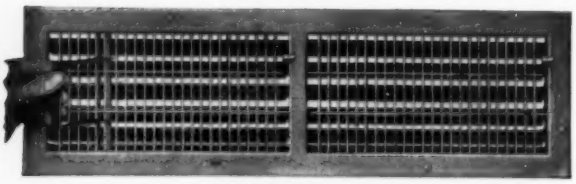
You can get
DIRECTED AIR FLOW
at any angle with
INDEPENDENT
"Fabrikated"
AIR CONDITIONING
REGISTERS



321-A HMV

Rear View Showing "HMV" Valves

Every grille bar adjustable individually—before or after installation



321-A HMV Tandem

Any direction of air flow—right, left, up, down and any combination—is easily obtained with "Fabrikated" Style No. 321-A HMV air conditioning registers, for residence or commercial installations, on sidewalls or ceiling. The face bars are adjustable to right or left; valves on the back are adjustable to direct the air flow up or down; valves may also be fully closed, and are connected to open or close in unison.

The angles of deflection and the combinations to be had are practically unlimited. Adjustments for directed air flow may be made before or after installation. Grille bars are held firmly in place and will not vibrate or rattle.

"Fabrikated" registers are available in sizes from 8 x 4" to 48 x 24", including tandem style. Special sizes can be made without special die set-up charges.

Write for Catalog No. 52.

Always Leading—Always Progressing

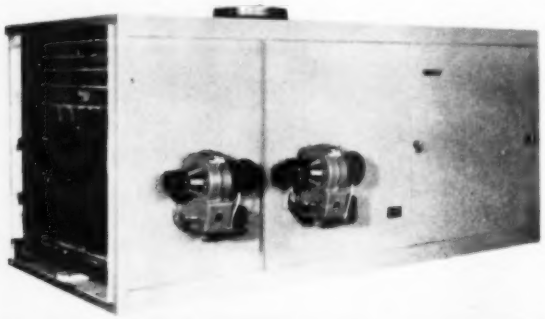
THE INDEPENDENT REGISTER CO.
3747 E. 93rd STREET · CLEVELAND, OHIO

EQUIPMENT DEVELOPMENTS —

(Continued from page 109)

Warm Air Suspension Furnace

WARM AIR suspension furnace designed to produce 1,000,000 Btu at bonnet and to handle 12,500 cfm of tempered air — Jackson & Church Co., Saginaw, Mich. The company has for the first time used a twin burner arrangement on a suspension unit. Each burner fires into a separate stainless steel combustion chamber at the rate



of 4½ gph. A unit designed for 800,000 Btu output on 7 gph of oil also is available.

With this burner arrangement, the unit can be operated with only one burner during mild weather. Burners are electronically controlled on the new unit. Units may be arranged singly or in batteries. Each one measures over 9½ ft long, without plenum, 52 in. high and 55 in. wide. AA 9

Gas Water Heater

STONE-LINED, underfired automatic gas water heater — Mor-Flo Heater Corp., Cleveland. The stone lining is designed to prevent rust and corrosion, and therefore leakage, and to preserve water in a clear state. The heater is available in 30 and 45 gal capacities. A one-piece flue baffle of heavy gage steel extends the height of the tank to provide maximum heat transfer. A snap-action, dial-type thermostat is provided along with an automatic shutoff control. AA 10

Copper-Jacketed Steel Nail

HEAVY-DUTY steel wire nail which has a thick copper jacket molecularly welded to the steel — Fanner Metals Products Co., Cleveland. The copper jacket is uniform over the entire nail, including the head, making the nail invulnerable to corrosion at any point on its surface, the manufacturer states. This feature, plus the unusually large sized head, makes the nail particularly useful in sheet metal roofing and flashing installations. The nails will be available in various lengths, diameters and head sizes. AA 11

All-Steel Press Brakes

NEW LINE of all-steel press brakes which includes a 50 ton, 100 ton, and 150 ton series — Niagara Machine and Tool Works, Buffalo. Bending, curling, jogging, corrugating, notching, and punching are among the opera-

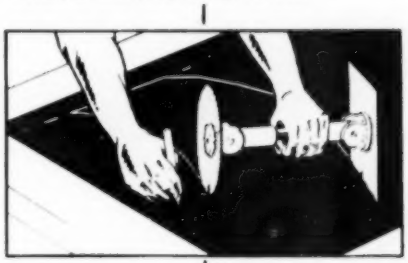
THIS IS IT!

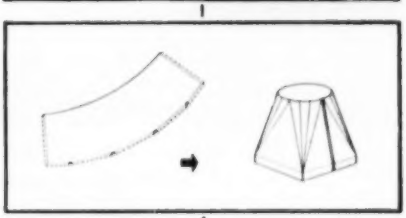
LAY OUT ANY PATTERN IN A FEW MINUTES WITH THE NEW JET PATTERN DEVELOPER

SAVES { TIME / MATERIAL / LABOR / SPACE } **MONEY**

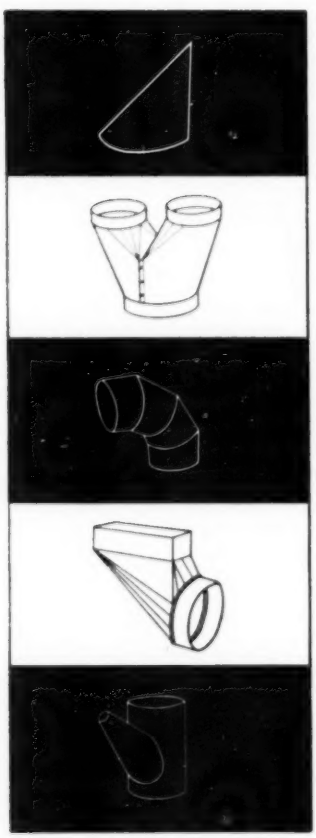
With the Jet Pattern Developer any mechanic can quickly and easily layout Square to rounds, Cones, Elbows, Intersections, Pair Pants, Register Booths, Dormers (any pitch), Transitions, Three piece transitional elbows round to square and thousands of other complex patterns. In fact we haven't found a pattern yet that can't be laid out in a few minutes time with this amazing new tool.

Simply attach templates, adjust for any pitch or offset and roll out your complete pattern. That's all there is to it.





Eliminates triangulation and radial lines, trimming, waste, large pattern stocks, and hours of time. You will save the entire cost of your JET PATTERN DEVELOPER in less than a week.



ONLY $69.50 COMPLETE WITH 30 TEMPLATES

MAIL THIS COUPON TODAY!

H. OWENS COMPANY, DISTRIBUTORS
9300 Venice Blvd., Culver City, California

Please send ..... Jet Pattern Developer(s) @ $69.50 each.

- ☐ Full amount enclosed send Postpaid
- ☐ Send C.O.D. I will pay postage
- ☐ Send more information

NAME .....

ADDRESS .....

CITY ..... STATE .....

10 Day Money Back Guarantee—Please include state tax

AIR-JET

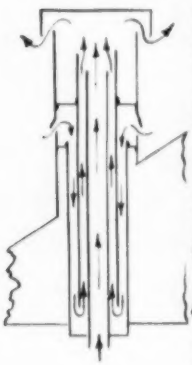
PACKAGED CHIMNEYS

- INSTALLATION IN ONE (1) MAN HOUR
- EXCLUSIVE NEW CHIMNEY PRINCIPLE
- UNDERWRITERS TESTED AND APPROVED

UL

AIR-JET is the new word . . . the last word in a PACKAGED CHIMNEY! New Jet boosted air-cooled principle affords light yet sturdy construction. Saves enough space for an average linen closet! Saves time and money on-the-job.

SPECIFICATIONS (TYPE "O" FOR ALL FUELS)



IT COSTS LESS

Only 1 man hour labor required for average installation . . . no cement . . . no special tools . . . nothing extra is needed for installation. . . . no assembling—READY TO INSTALL . . . factory painted.

STURDY CONSTRUCTION

Lightweight aluminum with shock-proof, high temperature porcelain steel smoke pipe. Weighs less than 100 pounds . . . Anti-downdraft top . . . raingroove flashing built-in.

TESTED AND APPROVED

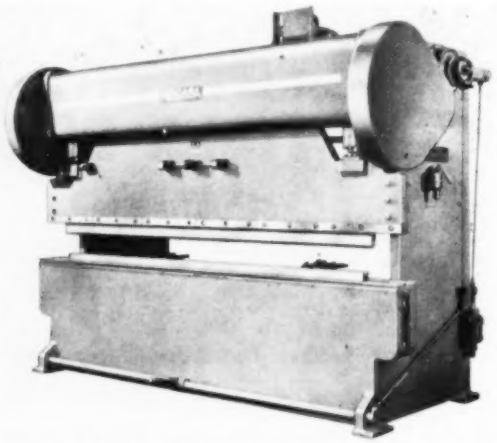
by Underwriters Laboratories for zero clearance from wood . . . windload tested for 25 pounds per sq. foot.

Above left is the airflow diagram. AIR-JET chimneys are available in standard 17" square and deluxe 17"x34" sizes. 6" smoke pipe. Write for further order information.

GENERAL PRODUCTS COMPANY

FREDERICKSBURG, VIRGINIA

tions these machines can perform. Laminated non-metallic ways are designed to maintain accurate alignment and reduce wear to the minimum. Double reduction gearing and double end twin drive with gearing enclosed in sealed baths of oil are intended to provide a smooth, balanced means of transmitting power to the



ram. The clutch and brake can be controlled by a foot treadle or palm buttons fastened to the ram which permit jogging, single stroking and continuous operation. With a motor reversing switch, the flywheel can be reversed to pull the ram out of accidental stalls. AA 12

Furnaces and Wall Heaters

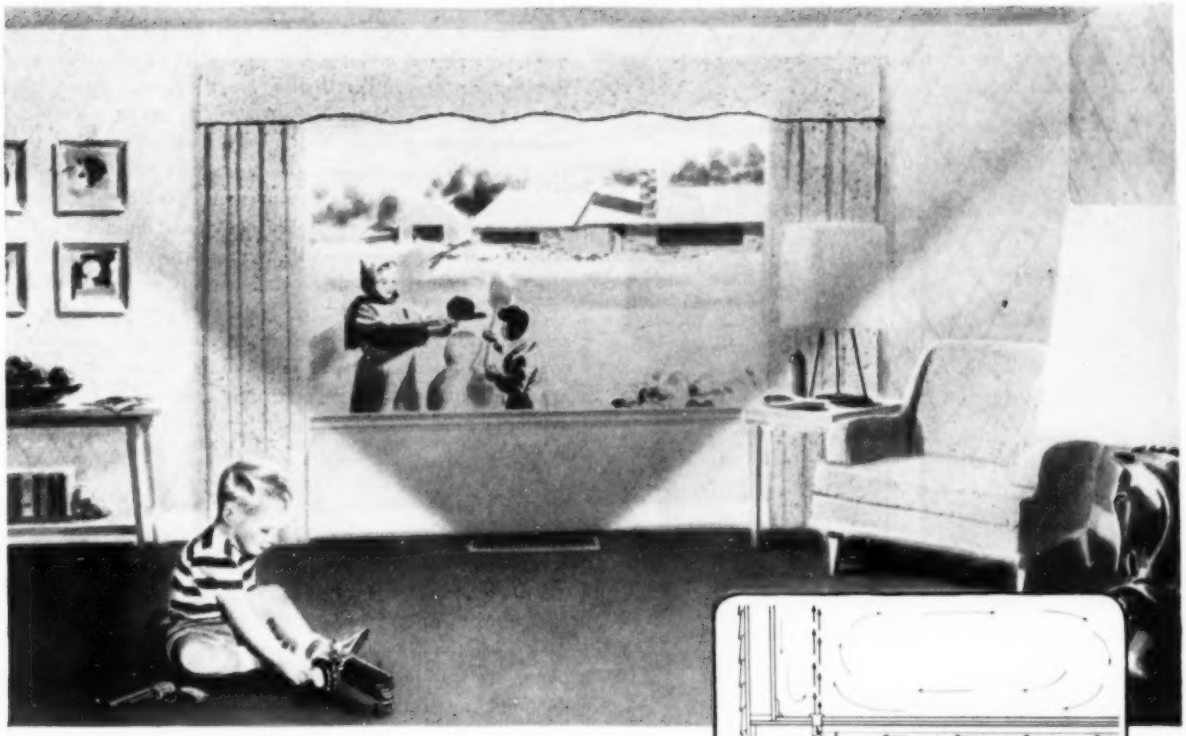
FIVE NEW MODELS in furnaces and wall heaters — Rheem Mfg. Co., New York. Furnaces include the Model 3302 gas-gravity type with 77,000, 95,000, and 112,000 Btu input capacities; Models 3203-60 and 3203-70 gas-fired, highboy furnaces, with 60,000 and 70,000 Btu input capacities, and zero clearance AGA approved; and Models 3205-80 and 3205-100 gas-fired counterflow furnaces, AGA approved for all gases, for installations on combustible floors or zero-clearance closet applications. The new wall heaters are Model 1801-288, a single wall, gas-fired recessed wall heater with 28,000 Btu input capacity; and Model 1801-50D dual wall, gas-fired recessed heater, with 50,000 Btu input capacity. AA 13

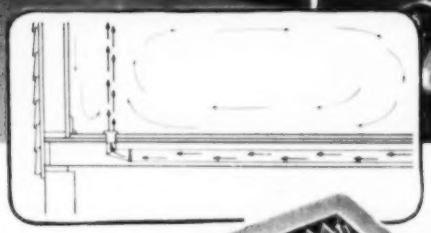
Barometric Draft Control with Nylon Bearings

BAROMETRIC DRAFT control with new, silent bearings made of molded nylon — Windmaster Corp., Columbus, Ohio. The bearings are designed to be self-lubricating, permanently silent and to provide floating action for the vane with a high degree of freedom from friction, resulting in faster response to changes in pressure. The bearings are immune to the bite of corrosive flue gases and are unaffected by extreme changes in temperature, according to the company. AA 14

Year 'Round Conditioning Unit

TWO-TON, gas fired, unit designed to provide summer and winter air conditioning for an average six room home — Servel, Inc., Evansville, Ind. The unit is intended to fulfill the following requirements for low price homes ($10,000 to $14,000 bracket): cost not to be over 10

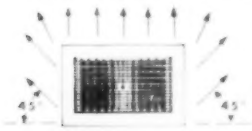




here's how the *Lima* floor diffuser assures you of proper air distribution in perimeter heating

It Must Be Better — To Be So Widely Copied

Originally developed by Lima engineers and still the finest, the Lima Floor Diffuser *does the complete job* of proper air distribution in perimeter heating systems. It diffuses a fanshaped blanket of warm air at reasonably high velocity to stop cold air in critical areas . . . *and* . . . it pulls air from within the room into circulation. This induced air circulation is so perfect that the constant aspiration of air is comfortable and complete without being noticed. The Lima Standard 2″x14″ size is particularly recommended in perimeter heating. Other sizes include 2″x12″, 4″x10″, 4″x12″, 4″x14″. Ask your wholesaler or write direct for literature today.



New Lima "45" Wall Diffuser for perimeter heating, where sidewall or baseboard outlets are preferred. Diffuses warm air upward and to all sides, starting at 45° angle from floor and extending over a 90° spread. The 20-22½° diffusion angle away from wall eliminates smudging . . . assures correct 70° angle upward from floor.

Lima WALL-O-WAY Stackhead and Frame simplifies out-of-the-wall installations in old house or solid wall construction. Use them in combination with the new Lima "45" Wall Diffuser or Lima Standard Wall Register.

nationally advertised to architects and builders

Lima **Register Company**
World's Finest Diffuser and Register Plant
LIMA, OHIO

sold exclusively through heating wholesalers and manufacturers

per cent of the price of the home; quiet operation; delivered as a unit; low cost in maintenance; and long life. The new model requires 8½ sq ft of floor space and is 75 in. high. AA 15

Conditioner

Panel

Structural Panels of Glass Fiber-Reinforced Plastic

RIPPOLITE translucent, lightweight, corrugated, flat and molded structural panels of glass fiber-reinforced plastic — Alexander H. Kerr & Co., Inc., Los Angeles. They are designed to allow light transmission without glare, to minimize heat from sunlight, and to give a uniform diffusion of light, making them especially suitable for skylighting or decorative lighting installation. The glass fibers bonded in plastic give strength to the panels which exceeds building code requirements, according to the company. The panels are not affected by extreme weather conditions when used outdoors; they will not buckle, crack or warp, and are designed to resist humidity, rot, mildew, salt water, heat, cold, etc., according to the manufacturer. They can be installed with ordinary tools, may be drilled, punched, or fastened by nails, bolts or screws and sealed with clear mastic. The standard corrugation permits rapid installation when the panels are used with matching corrugated material. They are available in standard lengths of up to 12 ft, and widths to 4 ft. AA 16

Water Heater

COPPERMATIC WATER heater with an inner tank of pure copper encased in a heavy steel tank, a design intended to afford special protection against rust and corrosion — Rheem Mfg. Co., New York. It will not crack or shatter even with the roughest handling, according to the company. A new technique in the fitting of joints protects the unit against electrolytic damage. Silver brazing connects copper flanges extending from the inner copper tank to the outer red-brass fittings. Copper, steel and brass are then fused into five-ply strength, and water is never in contact with steel. AA 17

YOUR HEATING CUSTOMERS WANT THE

Amazing Comfort this wire produces!

If you ever experienced HOT-n-COLD LIVING . . . and who hasn't . . . you'll know why more and more people *want automatic heat with* PENN CONTROLS.

Here's the reason. In PENN's room thermostat, there's a little wire that produces *heat anticipation* . . . the PENN-made magic that stops HOT-n-COLD LIVING. Automatically adjusting itself to outside temperatures, this thermostat quickly balances heat in-put with heat loss, *keeps indoor temperature within a half degree of selected level.* And that is real heating comfort!

Use this powerful sales point in selling automatic heat. You'll sell more, profit more! Mail coupon for FREE descriptive folders for handout or mailing to your prospects. **Penn Controls, Inc., Goshen, Indiana.** Export Division: 13 E. 40th Street, New York 16, N. Y., U. S. A. In Canada: Penn Controls, Limited, Toronto, Ontario.

PENN

AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, GAS APPLIANCES, PUMPS, AIR COMPRESSORS, ENGINES

Blind Rivet

PULL THROUGH blind rivet, with 3/32 in. diameter, for installation by one person from one side of the work — Huck Mfg. Co., Detroit. It has a nickel plated brass sleeve for tacking and fitting up purposes, as well as for attaching name plates, etc., in close, restricted locations. In conjunction with the rivet, the manufacturer has made available its new Model 120 hand tool for driving 3/32 and 1/8 in. diameter rivets, using one hand only. AA 18

Window Type Room Conditioner

EXPANDED 1953 line of window type room unit air conditioners featuring built-in thermostats as standard equipment, and now including a 1 hp model as well as the 1/2 and 3/4 hp models — United States Air Conditioning Corp., Minneapolis. The equipment is designed for year 'round operation, providing cooling, dehumidifying, filtering, circulating, exhausting, and ventilating. The thermostat, which permits selection of desired temperature by knob adjustment, controls only the compressor, so that the room air will be continually recirculated even when the refrigeration section is not in operation. AA 19

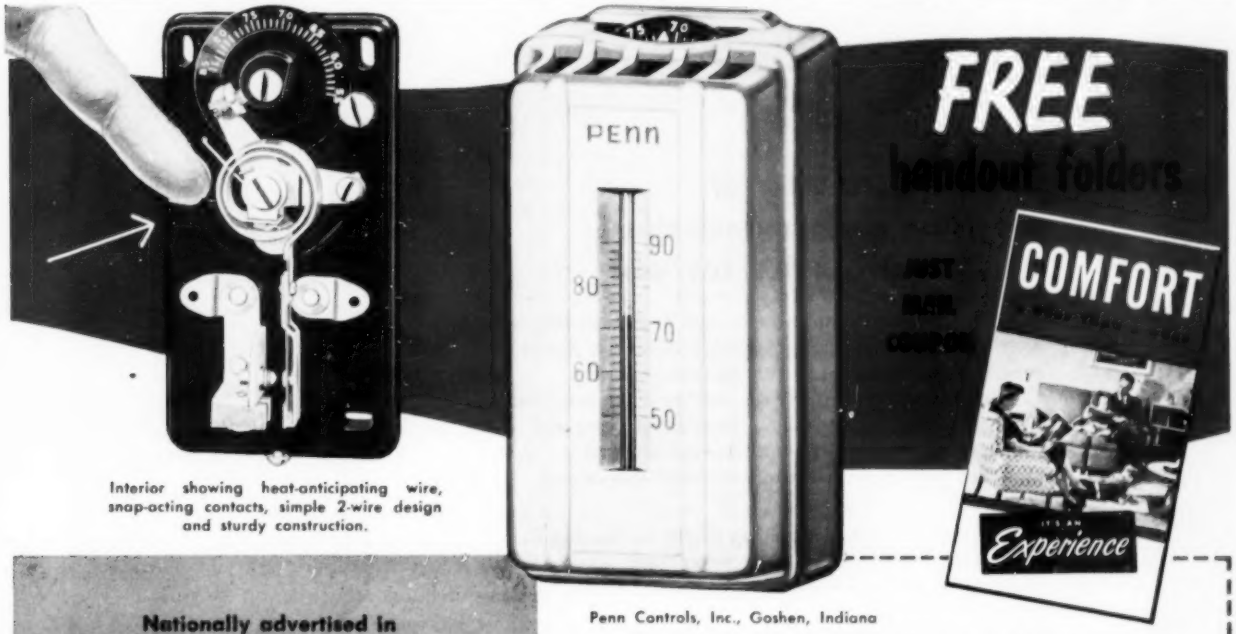
Screwdrivers with Tenite Handles

SCREWDRIVERS with Tenite handles and forged blades (hardened full length) which are assembled under pressure so that they cannot turn loose or come apart — Crescent Tool Co., Jamestown, N. Y. The handle knurling is designed to give a firm grip, yet is not cut so deep as to cause blisters, the manufacturer states. The tools are available in various lengths and diameters, and in both standard and cabinet patterns. AA 20

Four-Way Window Fan

THE 16RWF RIVIERA four-way window fan, a portable, reversible fan which operates at two speeds and may be used as an exhaust or intake fan for any window, or placed face up on the floor to provide room circulation — Westinghouse Electric Corp., Pittsburgh. It is designed to circulate 3200 cfm of air and is equipped with the company's air injector rings which are intended to boost air displacement by about 40 per cent.

Another new wheel-mounted model, the 16MA3 Mobilaire, is a combination window ventilator and portable



Interior showing heat-anticipating wire, snap-acting contacts, simple 2-wire design and sturdy construction.

Nationally advertised in
BETTER HOMES & GARDENS
AMERICAN HOME
NEWSWEEK

Penn Controls, Inc., Goshen, Indiana

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City_____ Zone_____ State_____

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. . . your assurance of precision performance that builds extra sales for you

Mueller Climatrol's up-to-the-minute manufacturing methods make possible precision production, insure precision performance in the finished product. Continuous inspection of each unit as it is assembled controls quality — means continued satisfaction and low maintenance cost to the user. And satisfied users are your best advertisers — build extra sales and steady profits for you.

You, too, can become the Big Name in Heating in your area. Write us, on your letterhead, asking about Mueller dealerships available to qualified concerns.

The L. J. MUELLER FURNACE CO.

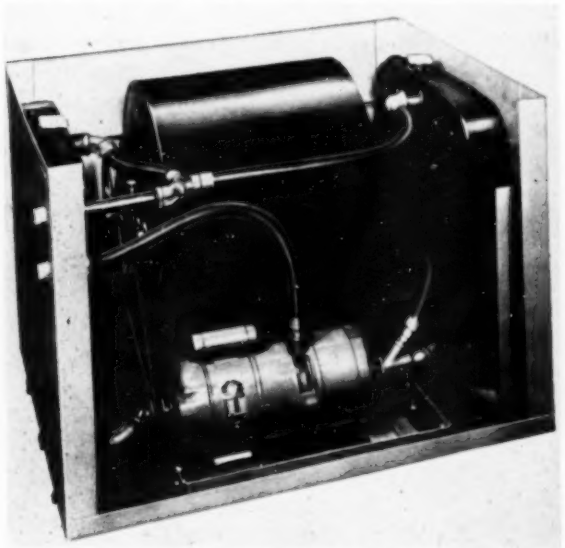
2030B W. Oklahoma Avenue • Milwaukee 15, Wisconsin

D-138

fan which may be placed 3 ft in front of an open window so as to exhaust the hot air inside a home, replacing it with cool air coming through another window. It exhausts or circulates 3200 cfm of air. Another innovation in the company's 1953 fan line is use of a new blade material, plastic Hemcolite S-R, in five models of 10 in. fans. AA 21

Water Cooling and Recirculating Unit

WATER SAVER recirculating unit designed to take the place of the outside water supply in air conditioners — Chrysler Airtemp Div., Chrysler Corp., Dayton. It has been developed for use with the company's 3 hp packaged residential and small store conditioners. It provides a steady flow of cooled water to the air conditioning equipment at proper operating pressure, and the



sealed-in water coolant prevents scaling and corrosion which might clog pipes, the manufacturer states. The unit receives heated water from the conditioner and retransfers the heat from the water to outside air. The warm water is forced through two automobile-type radiators; while a high capacity blower draws outside air through the radiators, the water is cooled, then returned to the conditioner. AA 22

Corrosionproof Water Heater

AUTOMATIC "Copper Core" gas water heater designed to be rustproof and corrosionproof — Trageser Copper Works, Inc., Maspeth, L.I., N.Y. The heater is so designed that water never touches any metal but the corrosionproof copper. The inner copper tank is encased in steel. The heater will not crack, and is tested to withstand pressure of 350 lb per sq in., the company states. Automatic cutoff controls and concealed working parts are featured. The unit will be produced in 20, 30, 45, 60 and 80 gal sizes. AA 23

Radiant Heater with Ceramic Panel

RADIANT CERAMIC heater which features a new ceramic panel housing the heating element, to reduce the hazards

New! Beautiful!

Mueller Climatrol

Types 116-216
Winter Air Conditioners

Pre-Wired
Pre-Assembled
Gas or Oil Convertible
Low-Cost Installation

Attractive — enclosed burners and controls, handsome styling, green crinkle finish. Compact—only 45" high, 24½" wide, 61½" long. Shipped assembled in two sections, makes installation easy — pre-wiring saves you time.

Cabinets are insulated with corrugated asbestos backed with aluminum foil for greater efficiency. Heat exchanger of heavy gauge, welded steel. Free-floating radiator is connected to drum at back only, for quiet operation. Continuous up-draft flue travel, with flue outlets on either side of cabinet simplifies installation. Large size, centrifugal type blower gives better air delivery.

Designed and approved for oil or gas convertibility — install for oil now — change to gas later at low cost. The new Mueller Climatrol Types 116-216 are the latest word in automatic home-heating equipment from the Big Name in Heating — Mueller Climatrol!

This is only *one* of many new items in the 1953 Mueller Line. Write for descriptive literature to the *L. J. Mueller Furnace Co., 2030B W. Oklahoma Ave.,* Milwaukee 15, Wisconsin.

D-138A

96th Anniversary

Mueller Climatrol

For the right fit, right away—always use Ohio Valley Furnace Fittings. A quick, snug fit means time saved on the job and a better installation. All Ohio Valley Furnace Fittings are made from prime-quality, full-gauge, galvanized steel—especially selected from the best production for quality furnace fittings. Handy cartons, clearly marked as to quantity, size, and type of fittings inside, make Ohio Valley Furnace Fittings even more convenient. For quality, speed, and ease in handling, make your next installation with Ohio Valley.

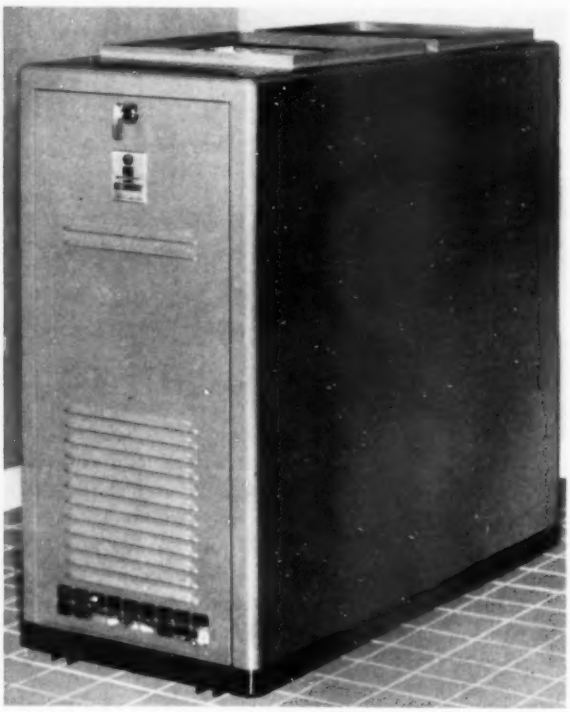
DO IT BETTER FASTER—WITH OHIO VALLEY
CARRIED IN STOCK BY LEADING WHOLESALERS

Ohio Valley Hardware & Roofing Company
METAL MANUFACTURING DIVISION, EVANSVILLE, IND.

of fire and burns — Heatmore, Inc., New York. UL tests have shown that accidental contact with the heater causes no burns, and that a sheet of cheesecloth, when placed in direct contact with the heater for several hours, shows no tendency toward combustion, according to the manufacturer. The panel was also proved shatterproof, even under extreme tension, the company states. The heating element's high resistance is designed to create longer infra-red wave lengths. AA 21

Gas and Oil-Fired Furnaces

ENLARGED LINE of Economy gas and oil-fired furnaces — The International Heater Co., Utica, N.Y. Units are factory assembled and designed specifically for the small home market. Featured are two assembled highboys of 84,000 and 96,000 Btu output; two assembled lowboys of 84,000 and 96,000 Btu output (with and without vestibule); and an assembled 84,000 Btu gravity model. Two new small oil counterflows of corresponding size

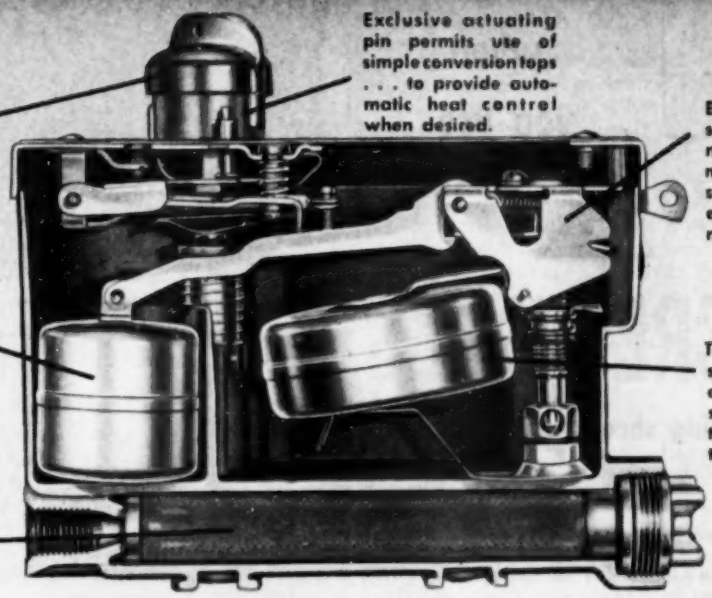


are also in the production stage. Additions to the gas line include three new assembled highboys of 65,000, 82,000 and 100,000 Btu input (with and without vestibule). There are also three new gas lowboys from 70,000 to 103,000 Btu input (with and without vestibule). Still in the testing stage are two gas counterflows and gravities. AA 25

Room Air Conditioners

THREE NEWLY styled and engineered electric room air conditioners with single all-season weather control dials by which the units can be made to perform year round. — Fresh'nd-Aire Co., Div. of Cory Corp., Chicago. The dial can be set so that units filter and heat the air.

Here's the tested basis
for profitable space-heater sales



Manual control knob permits adjustment of oil flow. Control is calibrated to suit burner characteristics.

Exclusive actuating pin permits use of simple conversion tops . . . to provide automatic heat control when desired.

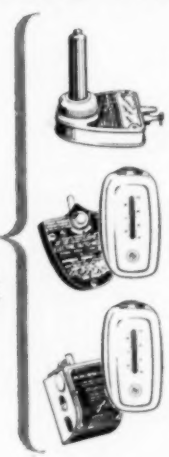
Exclusive design assures positive valve-needle alignment . . . makes float highly responsive . . . lengthens life of inlet-valve mechanism.

Separate safety float shuts off oil flow if dirt should hold inlet-valve needle open.

Temperature-compensating float automatically maintains preset oil flow, irrespective of varying oil temperatures.

Fine-mesh strainer quickly removed for cleaning without disconnecting oil lines. Dirt and impurities are removed with the strainer.

The Famous A-P Oil-Control Valve
with the exclusive Actuating Pin for quick conversion to Automatic Control



This Thermomatic Comfort Control provides automatic heating with no wiring . . . no electrical connections. Simply fits over manual control nameplate. Low in cost . . . no installation . . . no service.

Electric conversion kit provides regular room thermostat heat control for vaporizing oil-burner space heaters and furnaces. Any owner can install. Comes complete with transformer and wire.

Electric conversion kit for use either with draft fan or circulating blower on heaters and furnaces. For "on-off" or "high-low" speed control. Provides simple room thermostat heat control for fan-type heaters.

THERE are many good reasons why you'll find this A-P safety oil-control valve on so many famous space heaters. Manufacturers know that the efficient, economical and safe operation of vaporizing oil burners depends largely on the oil valve. They have found, too, that they get the very best in performance with an A-P valve.

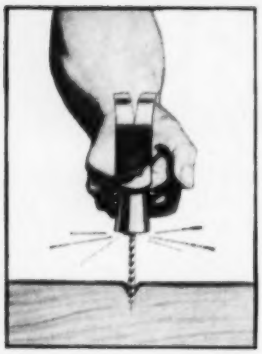
They get another "plus" with A-P valves . . . quick, easy conversion from manual to automatic heat control *without any change in the manual valve itself*. By merely mounting a Conversion Top on the manual control, all the advantages of completely automatic heat control can be provided at remarkably low cost. It's no wonder that the majority of space-heater manufacturers prefer A-P safety oil-control valves and that means more profitable sales for you!

A-P CONTROLS CORPORATION

DEPENDABLE *Controls*

for Air • Liquids • Gases • Refrigerants

2452 N. 32nd St., Milwaukee 45, Wisconsin
In Canada: A-P Controls Corporation, Ltd., Cooksville, Ontario



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TRADE MARK

Hardened SCREWNAILS

for fastening sheet metal to wood

• You drive it in like a nail, and as it spirals into the wood, it holds like a screw.

• P-K Screwnails are hardened. They won't bend or break, and, driven home, they won't work loose, or back out, even under the toughest vibration, expansion and contraction. Because each one makes a stronger fastening, fewer Screwnails need to be used on most jobs.

• The hard, needle point pierces lighter gauges of sheet metal with ease. For heavier sheets, holes can be punched first with a Screwnail Punch.

• Try P-K Screwnails, next time, for a better, faster, stronger job . . . and remember . . . IF IT'S P-K, IT'S O.K. Sold everywhere through accredited Distributors.

PARKER-KALON*
FASTENING DEVICES

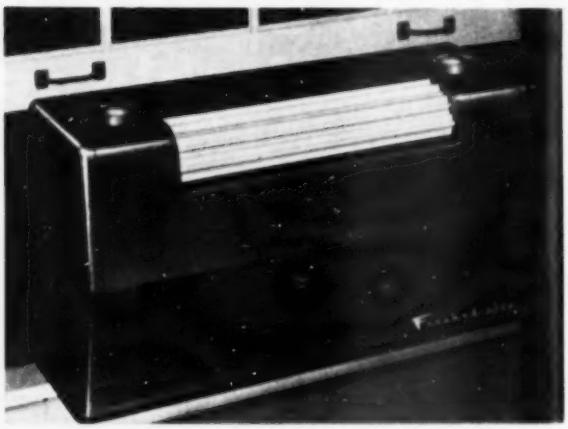
Makers Of The Original Self-Tapping Screws

Write for this folder

Gives sizes, head styles, Punch information, full instructions for use. Tells you the many ways Screwnails will help you do a better job. Parker-Kalon Corporation, 200 Varick Street, New York 14, N. Y.

*TRADE MARKS REG. U.S. PAT. OFF.

filter and cool the air, filter and dehumidify the air, exhaust stale air, act as low speed ventilators, act as high speed ventilators for filtered fresh air, or operate at



"slumber speed" for economical slow speed night cooling. Available on two models is an automatic thermostat. Cabinets extend 9⅝ in. into the room. AA 26

Winter Air Conditioners

SIX MODELS in gas fired, forced air winter air conditioners for use with natural, manufactured, mixed and LP gases — Southwest Mfg. Co., Aurora, Mo. Btu inputs are 80,000, 100,000, 120,000, 140,000, 160,000 and 200,000. Standard equipment includes a continuous weld, gastight, heavy gage die formed steel heat ex-

changer, cast iron burner, a built-in draft diverter, drawer slide blower mount, removable access door to controls, room thermostat, and combination fan and limit switch. A small coil spring on the slip fitting holds the air shutter in adjustment. AA 27

how draft looks at Draft Controls

(as a relief valve)

The primary purpose of a draft control is to act as a relief valve for excessive drafts. That's why it will pay you to study the advantages of a square body and angular mounted vane.

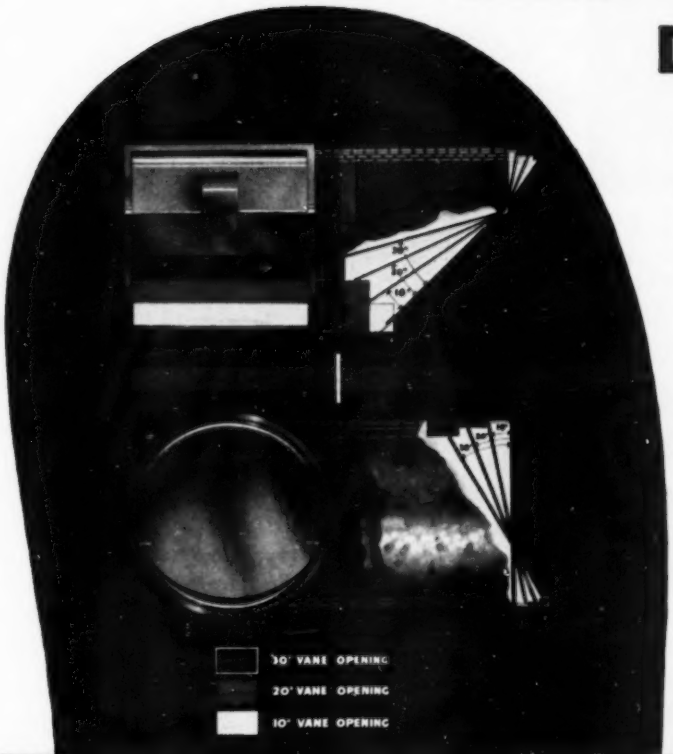
Look at draft controls the way draft looks at them and you'll see why Windmaster offers important exclusive advantages for increasing heating efficiency and improving oil burner performance.

Front view of the Windmaster Draft Control and a round draft control compares the free area available for relieving draft, and illustrates the marked advantages of

Windmaster's generous free area

OPEN VANE:	6" WINDMASTER GIVES YOU:	6" OTHER CONTROL GIVES YOU:
10°	3½ sq. in.	1½ sq. in.
20°	9 sq. in.	3 sq. in.
30°	14 sq. in.	4½ sq. in.

The greater the free area — the more rapid is relief and the more efficient is the heating unit performance



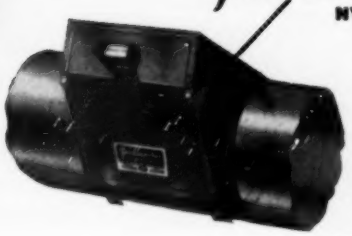
Profile views of the two controls show the great difference in distance of vane travel. The familiar nervous quiver of the vertically mounted vane and the longer travel time means *lag-time* — a problem eliminated by Windmaster's quick, steady control of draft.

TO PROVIDE IN FREE AREA	6" WINDMASTER MUST OPEN	6" ROUND, VERTICALLY MOUNTED VANE MUST OPEN
3 to 3½ sq. in.	10°	20°
9 sq. in.	20°	50°
13 to 14 sq. in.	30°	60°

Another Windmaster Exclusive

Jeweled Movement

NYLON BEARINGS



- Permanently Silent
- Outwear Steel
- Float Free From Friction
- Immune To Corrosion
- Unaffected by Temperature Changes
- Self-Lubricating

manufactured by

Windmaster Corporation

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Send For "The Windmaster Story" Today

Windmaster Draft Control

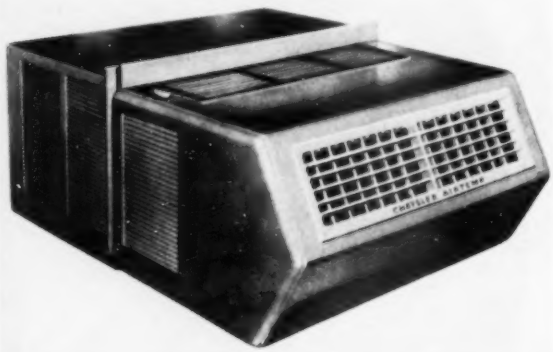
Top Quality
NATIONAL LOCK
Hardware
makes a good product better

Ask About It For Use On
air conditioning equipment . . .
stokers . . . gas heating units . . .
oil burners . . . humidifiers . . .
space heating units

write for complete information
NATIONAL LOCK COMPANY
ROCKFORD · ILLINOIS

Window-Type Air Conditioners

Two NEW models of window-type room air conditioners, powered by 3/4 and 1 hp motors — Chrysler Airtemp Div., Chrysler Corp., Dayton. A new feature is the four-way adjustable fresh air discharge. Both models are 27½ in. wide and 15⅜ in. high. A supporting cradle and window sealing materials are supplied. A three-



position control selects either of the ventilating or ventilating and cooling stages. The unit also removes excess moisture from humid summer air and discharges it outdoors. Moving parts within the unit float on rubber mountings for vibration-free operation. AA 28

Reversible Window Fans

NEW 16 IN. and 20 in. electrically reversible window fans with shallow cabinets, new type blades and silver gray finishes — Emerson Electric Mfg. Co., St. Louis. Direction of rotation is reversed when the switch is flipped to pull in cool night air or exhaust hot indoor air. Both fans have a two-speed capacitor motor and balanced blades designed to assure maximum air flow and quiet operation. Adjustable panels permit quick, easy installation in windows from 16 in. wide to 29 in. wide for the 16 in. fan, and 20 in. to 29 in. wide for the 20 in. fan. The 16 in. fan delivers 2000 cfm on high speed, the other, 3200 cfm. AA 29

Home Cooling Units

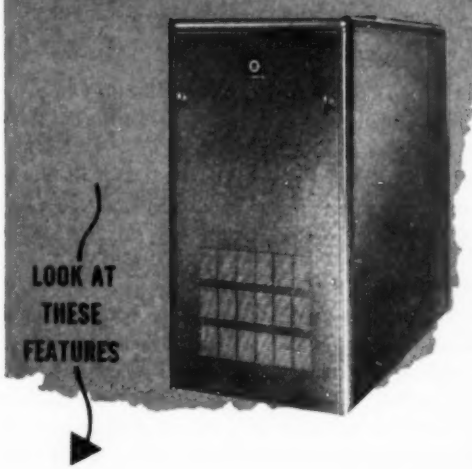
RESTYLED AND redesigned home cooling units, now including a 5 ton as well as 2 and 3 ton models — General Electric Co., Bloomfield, N.J. These packaged units are intended for use in existing homes with suitable forced warm air heating systems. Units are 55 in. tall and 30 in. deep. The 5 ton unit is 25 in. wide. AA 30

Centrifugal Blowers

CENTRIFUGAL BLOWER in models to meet a wide variety of air moving needs — Hartzell Propeller Fan Co., Piqua, Ohio. Included in the new line are belt-driven models in sizes of 9 to 30 in., direct-drive models in sizes of 4½ to 12 in., high pressure blowers in sizes from 8 to 12 in., and utility blowers in sizes from 12 to 48 in., either single width-single inlet, or double width-double inlet. AA 31

The WINTERWAY Winter Air Conditioner

by AMERICAN-Standard



one of the finest oil-fired units you can sell... *any way you figure it!*

● The Winterway is a steel winter air conditioner that's quality-built throughout. Made in two sizes—100,000 and 120,000 Btu capacity at register—to meet the heating requirements of small to medium sized homes, this basement type unit can easily become one of your most popular sellers.

What's more, the Winterway is remarkably easy to install. The flue can be located on either side, thus permitting unusual flexibility in locating the unit. Solid base with channel stiffeners and leveling screws facilitate installation on uneven floors. When furnished with an Arcoflame oil burner, all necessary wiring and controls are included. The unit is also available without burner if desired.

For more information about the Winterway and other American-Standard warm air units, contact your wholesale distributor.

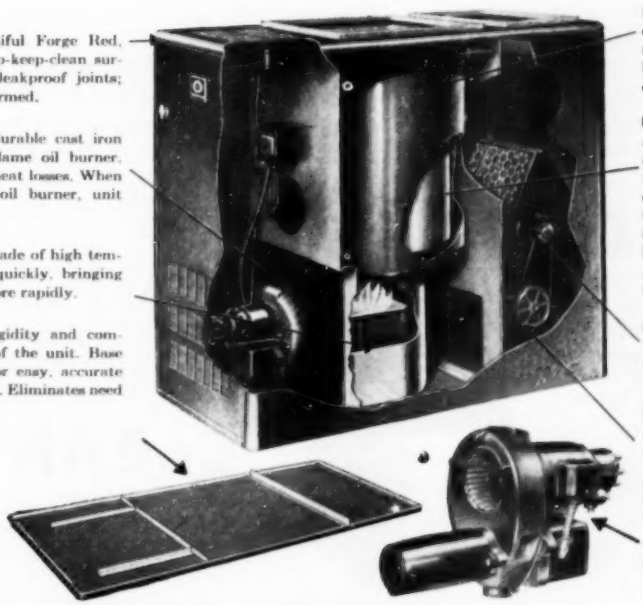
American Radiator & Standard Sanitary Corporation
P. O. Box 1226, Pittsburgh 30, Pennsylvania

JACKET—finished in beautiful Forge Red, featuring a smooth easy-to-keep-clean surface. Rigid construction, leakproof joints; all parts are die-cut and formed.

BURNER PLATE—made of durable cast iron for flange mounted Arcoflame oil burner. Heavy insulation reduces heat losses. When furnished less Arcoflame oil burner, unit has steel burner plate.

COMBUSTION CHAMBER—made of high temperature steel. Heats up quickly, bringing flame to peak efficiency more rapidly.

BASE PAN—offers extra rigidity and completely seals the bottom of the unit. Base pan has leveling screws for easy, accurate adjustment on uneven floor. Eliminates need for grouting at floor line.



RADIATION SHIELD—increases efficiency, minimizes heat loss into the basement, keeps jacket cooler.

HEATING ELEMENT—wrap-around type, baffled radiator encircles shell, providing maximum heating surface. Flue gases enter full-height opening into radiator, assuring faster heating, eliminating hot and cold spots. Seams are electric welded and absolutely leakproof.

MOTOR—quiet, dependable, constant duty type. Built-in overload protection. Adjustable motor pulley provides selective blower speed.

BLOWER—provides positive air circulation. Double inlet type with large air handling capacity. Unusually quiet.

ARCOFLAME OIL BURNER—special flange type model coordinated with the Winterway for best results. Designed to give economical performance with low cost domestic fuel oils. Listed by Underwriters' Laboratories and complies with Commercial Standard CS-75.

AMERICAN-Standard HEATING

REMEMBER:
THE AMERICAN-Standard LINE MEANS MORE BUSINESS FOR YOU IN 1953

Serving home and industry

AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS

NEW LITERATURE

2-53

For your Convenience to Cut Out and Mail

We will ask the manufacturer to send you the literature described.

Be sure to circle the items which you wish.

101 102 103 104 105 106 108 109 110

Name ..... Title .....

Company .....

Street .....

City ..... Zone ..... State .....

Mail to AMERICAN ARTISAN, 6 N. Michigan Ave., Chicago 2, Ill.

Guide to Steel Selection

CHARACTERISTICS, mechanical properties and uses of hot rolled and cold finished carbon and alloy steel bars are covered in condensed form in a 4 page bulletin — Joseph T. Ryerson & Son, Inc., Chicago. The bulletin is designed to facilitate making comparisons of the different types and to help in the selection of suitable qualities of bar steel for jobs that come up most frequently in the average shop. AA 101

Contour Shears

CATALOG TS (4 pages) illustrates and describes contour shears for circle and shape cutting, beading and forming — Wales-Strippit Corp., North Tonawanda, N. Y. Inside cutting requires no starting holes and material may be started while ram is operating. AA 102

Soldering Brochure

RESISTANCE SOLDERING is explained and its uses in production and maintenance in industry are outlined in an illustrated brochure entitled *The New Way to Solder* — Wasserlein Mfg. Co., Inc., Joliet, Ill. Also included are operating instructions for using a resistance soldering unit and accessories. AA 103

Almanac for Heating Men

A POCKET SIZE almanac contains tables on overhead and profit, cubical contents of rooms, heating and ventilating symbols, tables of weights for galvanized sheet steel, etc. — Ashburn Supply Co., Culver City, Calif. A glossary of heating terms is included, also tips on balancing and installation tips for thermostats and gas valves. AA 104

Arc Welding

ELECTRIC MOTOR DRIVEN and gasoline engine driven arc welders are illustrated and described in a 20 page booklet — The Hobart Brothers Co., Troy, Ohio. Featured

BUY the DIFFERENCE

. . . at No Extra Cost

Only Airsan offers you ALL these Filtering features —

- *Galvanized steel frames*
- *Bronze welded corners*
- *Drain solts for quick, easy cleaning*
- *Expanded metal face plates act as lint arrectors*

Airsan Air Filters are viscous type, permanent and cleanable. Write for free bulletins. "AIRSAN" is Reg. U. S. Pat. Off.

Air Filter Corporation
108 A NORTH WATER ST. • MILWAUKEE, WIS.
Canadian Representative
DOUGLAS ENGINEERING CO., LTD., MONTREAL
A Few Distributorships Available. Write for Details.

in the booklet are a number of short articles describing unusual applications. AA 105

Oil or Gas Utility Furnaces

UPFLOW MODEL (UF-22) oil or gas fired heating units for heating systems requiring a warm air plenum at the top of the furnace and downflow model (DF-22) for systems where warm air is to be sent downward into a sub-floor plenum are covered in a recently issued 4 page circular — The Majestic Co., Inc., Huntington, Ind. Also available is an 8 page booklet for the home owner entitled *Care and Operation of Your Warm Air Heating System*, containing suggestions for the care of oil and gas burners, blowers, motors and filters. AA 106

Merchandising Plan

BRYANT HEATING DIV., Affiliated Gas Equipment, Inc., has assembled a new catalog and merchandising plan whereby contractors can obtain better ideas for putting across their sales points when customers show interest in either gas or oil fired furnaces, space heaters, conversion units, water heaters or year 'round air conditioners.

The sales package is filled with illustrations of how to keep the customer interested in the equipment being demonstrated and how to make it easy for him to comprehend the operation of the equipment. Sketches and pictorial cuts are used to show cutaway views of how the equipment looks when properly installed.

Each product section has a check list for emphasizing the distinctive features of the heating and cooling equipment. If a copy of this sales aid is desired, write on your business letterhead to Bryant Heating Div., Affiliated Gas Equipment, Inc., 17825 St. Clair Ave., Cleveland.

Fittings for Warm Air Heating Systems

A COMPLETE LINE of standardized pipe, ducts and fittings for warm air and air conditioning distribution systems is described in catalog No. 9A (44 pages) — The Excelsior Steel Furnace Co., Chicago. Products covered include fittings for small pipe systems, galvanized fittings for gravity installations, stainless steel chimney liners for gas heat installations, registers, forced air ducts and fittings, etc. AA 108

Humidifier Display

A COMBINATION floor and counter display, built in two separable units, shows the Series 600 humidifier — Skuttle Mfg. Co., Detroit. Where a floor display is not practical, the top unit lifts out of the base to make a counter display. Both parts are built of heavy corrugated board, and are shipped folded. AA 109

Perimeter Diffuser Display

A DISPLAY showing a perimeter diffuser installed in the wall of a home is available to dealers and jobbers — Titus, Inc., Waterloo, Ia. Offered with the display are catalogs, price sheets and educational data on perimeter heating and cooling. AA 110

LICK COMBUSTION TROUBLES without shutting down the heating plant!

Patents Pending

Most combustion troubles—pulsating, sooting, puffing of oil-fired, units . . . . condensation and wet chimneys with gas-fired heating plants . . . puffing, sooting, clogging of coal-fired furnaces—are due to inefficient draft.

Cause may be a cold chimney, "short" chimney, bends in the chimney, long smoke pipe or elbows in the smoke pipe. Even if conditions are ideal, full natural draft to support *complete* combustion and carry away *all* troublesome combustion products is not established until the chimney is warmed up.

Quickdraft corrects this condition immediately by creating full draft when firing begins. It operates through the firing period yet does not "build up" excessive draft. There are no obstructions in the smoke pipe.

Quickdraft is as simple and easy to install as a length of smoke pipe which it replaces . . . can be installed between firing periods on oil or gas-fired plants . . . when the fire is down in coal-fired furnaces. Quickdraft can be wired after the unit is in place.

Quickdraft is reasonably priced, simple, foolproof . . . built for long service.

Thousands of homes in your area need Quickdraft for efficient trouble-free heating. Cash in on this ready-made market. Write or wire for details.

quickdraft
COMPANY
1640-D Cleveland Ave., NW, Canton 3, Ohio
DIVISION OF THE HALL'S SAFE COMPANY, INC.

NEW LOW COST HACKER

STANDARD HEATING EQUIPMENT CO.
WATERLOO, IOWA

CABINET OIL BURNING FURNACE

AFTER FIVE YEARS OF EFFICIENT OPERATION, OWNERS EVERYWHERE ARE ENTHUSED OVER THE *QUIET OPERATION* AND THE *LOW FUEL BILLS*

- HEAVY STEEL BODY... WELDED CABINET
- FOUR SECTION PREHEAT CHAMBER
- AIR FILTER EXPANDED FIBRE 20" x 25"
- ¼ H.P. MOTOR WITH VARIABLE SPEED PULLEY
- 12" WHEEL BLOWER
- RETURN AIR INLET 16½" x 16½"
- WARM AIR OUTLET 16½" x 22"
- GUN TYPE BURNER
- STAINLESS STEEL COMBUSTION CHAMBER
- BAKED METALESANT CABINET FINISH

Here is the furnace that will get you the contract. Keep your *cost low* when bidding gets tight. Dealers everywhere are making an *excellent* profit even against the most vicious competition. Shipped completely assembled for *lowest installation cost.*

MAIL COUPON TODAY!

FREE LITERATURE

Standard Heating Equipment Company
Waterloo, Iowa

Gentlemen: Rush me complete money saving facts on the new Hacker oil-burning furnace.

NAME .....

ADDRESS .....

CITY ..... STATE .....

we hear that . . .

AT A RECENT MEETING of the Detroit Warm Air Heating Association, J. A. Clarke, regional manager, Chrysler Airtemp Sales Corp., spoke on the subject of the market potential for home air conditioning. "This potential", he said, "is far greater than the huge market which was ready for central home heating earlier in this century."

In presenting the case for future expansion in the air conditioning industry, Mr. Clarke illustrated recent advances in small store and residential air conditioning applications, and pointed out that the warm air man is in a particularly good position to benefit from this vast new market because of his practical knowledge of ductwork, air currents and ventilation applications. He explained that air conditioning has been simplified for both buyers and installers, the packaged unit having taken precise technical and engineering work out of the residential field in addition to cutting time and customer costs and minimizing interior changes.

"Every warm air heating owner", he said, "is a prospective air conditioning buyer, because there is not a warm air heating system in the country that cannot be modernized to include an air conditioning system."

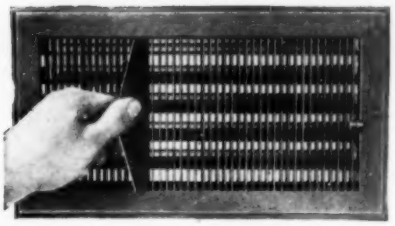
EMPLOYEES of the Robertson Heating Supply Co., Alliance, Ohio, gathered at the Alliance Country Club for their annual Christmas dinner party. Welcome was extended by John Robertson, who spoke briefly on the growth of the company and gave special recognition to the 22 employees with more than five years' service. Christmas bonus checks, totaling $15,091, were distributed to the 108 employees in the organization.

GUESTS ATTENDING the Robertson Heating Supply Co. Christmas party numbered 186. Place cards were holiday-wrapped giant size chocolate bars

WESTINGHOUSE Air Conditioning Div., Westinghouse Electric Corp., has been conducting a series of three-day application engineering schools for its air conditioning distributor personnel. The course was conducted by the headquarters team of J. R. Welch and R. E. Borden. The first day of the school was devoted to packaged units. The second two days covered field-assembled systems. Graphs, blow-ups, movies, strip films, etc., were used to

SELL MORE SATISFACTION WITH THESE UNEQUALED U. S. REGISTERS

Better heat distribution . . . better-looking registers . . . you have a better chance to make every customer a booster for your service when you standardize on U. S. Registers. Whatever type of warm air heating your contract calls for there are properly engineered, neatly designed U. S. Registers to do a perfect job.



U. S. No. 256

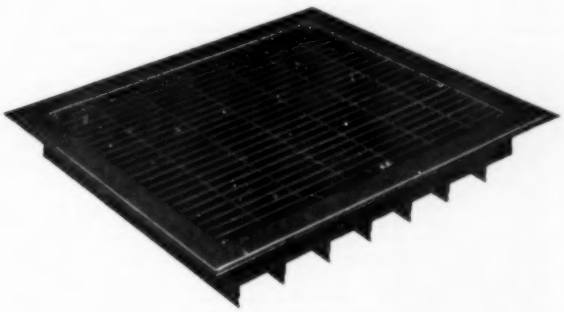
For Standard A-C Systems

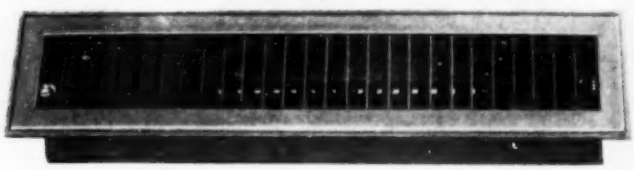
This is the outstanding leader of air-conditioning registers. It adds tone and provides ultra-efficiency in air distribution with non-vision lateral diffusion, 4-way flow, and perfect lever operation. Can be installed with square or round-back stackhead, with air stream coming from *any* direction.

U. S. No. 400

For Gravity Installations

Close-mesh to keep out small heels . . . multiple valves assembled the SHORT WAY to prevent air stream from "washing" the walls . . . smooth, seamless corners for quick installation . . . every feature you want is combined in U. S. No. 400 Trusteel floor registers.





U. S. No. 410

For Perimeter and Small Pipe Systems

This new diffuser floor register gives you the perfect wide air-diffusion required to blanket windows and cold walls. Vanes are set at graduated angles. When required, lever-operated valve can be set to deflect air slightly from vertical to prevent soiling walls, drapes, curtains. Made in 7 sizes to meet all needs.

WRITE FOR No. 53 CATALOG

UNITED STATES REGISTER COMPANY

BATTLE CREEK, MICHIGAN

MINNEAPOLIS • KANSAS CITY • ALBANY

SOLD BY LEADING JOBBERS FROM COAST TO COAST

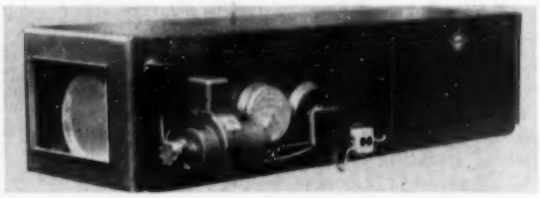
Horizontal Furnaces Opening New Profit Opportunities

Heating Contractors Help Builders Beat Rising Costs and Make Money Doing It

Keeping the cost of new homes within the reach of potential buyers is a major problem today. Builders and contractors are meeting it in two ways: First, to beat the high cost of single lots, they are developing large tracts of land and building many homes at the same time. Second, they are eliminating every possible costly feature — basements, garages, even service rooms.

New Furnace Opens New Field

This is opening up a whole new field of opportunity for the heating and sheet metal contractor—the sale and installation of underfloor, central warm air heating systems. The sensational NEW "Besser Junior" makes central heat possible in even the lowest cost homes.



The Besser Horizontal Furnace Needs No Basement or Utility Room — Can be Installed Under-floor or Overhead

Because of the great savings, more and more builders are turning to the new type horizontal, oil-burning furnaces. A central heating system adds value to any house, makes it easier to sell—is far superior to floor furnaces. Now, the NEW "Besser Junior" brings central heat within every price range.

Here's Where Profits Are Made

Bidding on the big jobs is always competitive, so where do you come in? Here's the answer: to start with, you've got something to sell—the answer to a builder's prayer—a way to put central heat into every house without the cost of a basement or utility room. That's a natural advantage. Now, the cost is lower than ever.

Still, you may have to figure closely, so where's your profit? Right here! Service call-backs are what eat up your profit. When you install a Besser Horizontal, service calls are fewer—far fewer—because only the best goes into a Besser! Properly installed, it's virtually trouble-free. Call-backs will be few and far between. Every Besser is fully guaranteed . . . because it's built to last!

Besser Plant Facilities Expanded 50% to Meet Growing Demand

Double Sales Possibilities

Quiet, automatic Besser Horizontals are equally adaptable to overhead installation on commercial jobs where floor space is at a premium. One furnace gives you a double sales potential. Full range of sizes to meet every job need—delivered to you assembled, ready to install.

New Territories To Be Opened

Greatly expanded plant facilities make it possible to serve a larger area. Distributor franchises and dealerships in certain areas offer a real opportunity for profit in a product you can sell with confidence. Inquiries from aggressive Manufacturer's Agents invited. For full information write: Besser Metal Products Corp., 754 Clement Ave., P. O. Box 4064, Charlotte, N. C.

we hear that . . .

put the points across. Some of the subjects discussed were cooling load estimates, equipment selection, psychrometrics, sheet metal ducts and types of conditioning sys-

INSTRUCTOR J. R. WELCH discusses how to select cooling coils. First school, pictured here, was held at Hotel Kenmore, Boston

tems. Cities covered included Boston, San Francisco, Los Angeles, Dallas, New York, Chicago, Cleveland, Philadelphia, Atlanta and Orlando.

THE TIFFIN ART METAL CO. held a three-day sales meeting, January 13 to 15, at the Shawhan Hotel, Tiffin, Ohio. Meetings on the first day were devoted to discussions of heating and cooling equipment and registers and grilles. The second day, subjects included gas-oil heating equipment, controls for warm air heating, filter sales plans, asphalt and asbestos products and sheet metal roofing. The final program featured discussions on copper products, solder, credits and accounts, and roof coatings and plastics.

REPRESENTATIVES of Eastern and Midwestern manufacturers enjoyed the hospitality of the Tiffin Art Metal Co. at its three day sales meeting

A NUMBER of experienced oil burner men have completed the three day course in specialized oil heating procedures being offered by the new Boston School of Advanced Oil Heat Training. Graduates receive certificates of completion stating that the student has successfully completed the course and, in the school's opinion, is qualified to prescribe the specialized procedures necessary to obtain the maximum efficiency from any combination of pressure atomizing oil burner with any type of furnace.

(Please turn to page 133)

It's a BETTER Oil Burner Installation

with VENTALARM® Signal

The WHISTLING Tank Fill Signal

Safe Fills
No Spills

Oil man need never enter home.

TRADE LIST
Model LA
$1.95

and SCULLY® Gauge

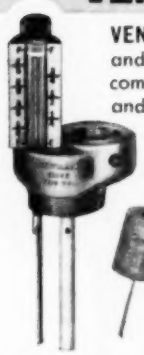
Easily read from even 10 ft. away
Leak proof; adjustable to any angle;
completely assembled.

TRADE LIST **$1.45**

Easy to install whether or not oil is in the tank. Just use the "Button-Lift".

or this
Money-Saving Combination

VENTALARM®-GAUGE



VENTALARM Signal and SCULLY Gauge combined in one labor- and money-saving unit.

TRADE LIST
$2.95

One item to install instead of three. For 275-gal. tanks. Specify tank opening and depth when ordering.

▲ FREE "Name Card" with every SCULLY Gauge or VENTALARM GAUGE

Slips into place on top of gauge. Assures permanent identification of your company.

Trade Prices shown subject to change without notice.

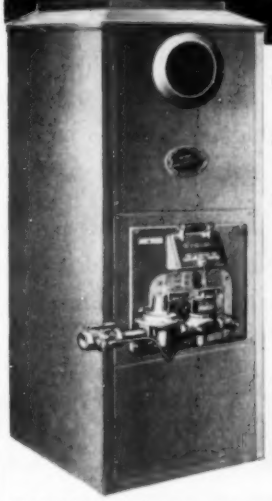
See your regular Supply House or write to Dept. 72

SCULLY SIGNAL COMPANY
First Street, Cambridge 41, Mass.
Scully products are manufactured under U. S. and foreign patents or patents pending.
Canadian Licensee: EMPIRE BRASS MFG. CO., LTD., London, Ontario

The BETTER Answer to Small Home Heating

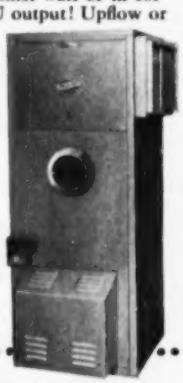
Majestic's "22" SERIES

An Automatic
Oil or Gas Furnace for perimeter, crawl-space, or other systems



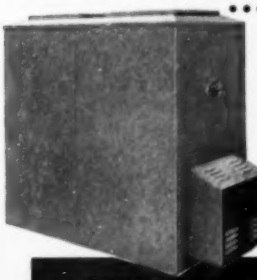
- **Versatile** — Either upflow or downflow models for small home requirements
- **Compact** — Only 22 inches square at base, just 66 inches high
- **Unique** — Square-outside, round-inside heat exchanger
- **Efficient** — Channeled circulating air cools casing, ups efficiency
- **Quiet** — Powerful blower and burner are rubber mounted
- **Thrifty** — Precision-made burners utilize every ounce of fuel
- **Attractive** — Silver-green or Silver-blue finish for durable beauty

This big-little furnace warms every room with even, automatically-controlled heat — thermostat control ends furnace cares! All connections at front, including vent! Sets against wall or in corner of basement or utility room! 80,000 BTU output! Upflow or downflow! Drawer-type oil or gas burner in front of unit. Each unit factory assembled — saves time and labor! Ideal for housing projects!



"26" Series
For Needs Up To 95,000 BTU

For slightly larger demands, Majestic's "26" Series gives all advantages of the "22" Series — but with a 95,000 BTU capacity. Ideal for small homes or zoning of large houses and apartments. Comes assembled *with* electric wiring, ready for easy connections at site!



For Small Homes With LOW BASEMENTS

Majestic Horizontal Flow Furnaces fit in low basements — Heat, filter, humidify, and circulate warm air to every room. Up to 110,000 BTU capacity! Super-air blower reduces room temperature in summer. Packaged for easy handling.

Complete summer air-conditioning is
NOW AVAILABLE
with all Majestic heating units.
Write for details and prices.

The *Majestic* Company, Inc.
394 Erie Street — Huntington, Indiana
HEATING SPECIALISTS SINCE 1907

Manufacturers' Agents

Are you interested in securing additional lines?

We are occasionally asked by our manufacturer advertisers to suggest the names of manufacturers' agents in various sections of the country whom they can contact in regard to representation of their warm air heating, residential air conditioning and sheet metal products.

If you would like your name listed on our records for inquiries we may receive on your territory, we invite you to write us. There is no charge in connection with this service.

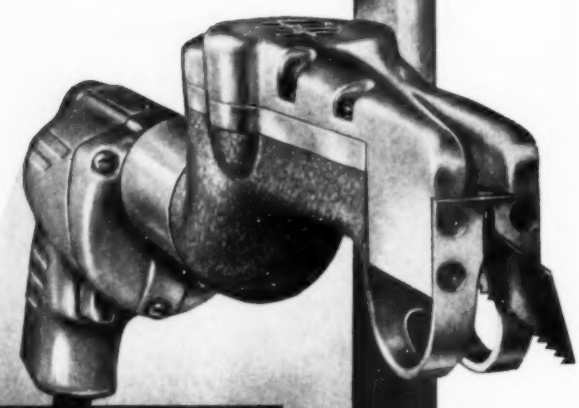
AMERICAN ARTISAN

6 N. Michigan Ave. Chicago 2, Ill.

R.C.S. SUPER SAW

SAVES YOU MORE TIME, RIGHT ON THE JOB, THAN ANY OTHER TOOL IN YOUR KIT!

A Journeyman's tool, built to stand up under constant, on-the-job Contractor or industrial use. Needs no starting hole—has built-in blower — fits any heavy duty ¼" or ⅜" drill — blades to cut all materials — listed on Federal Supply Schedules, Class 40 Materials.



SEND THE COUPON FOR FULL FACTS

R. C. S. TOOL SALES CORPORATION
JOLIET, ILLINOIS

Please send literature to: A-2

Name_____

Address_____

City_____ State_____

we hear that . . .

(Continued from page 130)

Only those who have had one or more year's service in actual oil burner installation and service experience are qualified for enrollment in these courses. Classes are limited to a maximum of 10 students in order that individual attention can be given to each and to facilitate that portion of the course where laboratory work is necessary.

THE DELAVAN MFG. CO. has moved its headquarters into its new plant at Grand Ave. and Fourth Street, West Des Moines. This is the third plant expansion for the company since its formation as a division of the Delavan Engineering Co., which was organized in 1937.

THE WEST DES MOINES plant of the Delavan Mfg. Co., completed in November, provides more than twice as much area as the firm's Des Moines plant

THE OUTLOOK for 1953 is highly favorable for the home heating and cooling business, according to S. J. Levine, general manager, Home Heating and Cooling Div., General Electric Co., who spoke at a recent press meeting in Chicago. A primary factor is the rate at which new construction is being completed, he said, and indications are that residential building will continue at a rate as high as in 1952. He stated that approximately 20,000 homes were completely air conditioned in 1952, with about twice that many being the goal for 1953. The combination of different types of fuels and Btu capacities of furnaces, along with the three standard sizes of condensing units, make it possible to have about 200 different combinations to meet the needs of almost any residential application, he said.

OWENS-CORNING FIBERGLAS CORP. has been using television in its mid-winter air filter sales campaign. Arthur Godfrey, during his earlier Fiberglas television and radio program, had been telling his audience that filters should be changed twice a year for best results, that clean filters mean more heat and lower fuel costs. During January and February, he told his listeners that the time had arrived for the second change. To assist in the campaign, the company sent its dealers display promotion material to tie in with the television program.

GERRARD STEEL STRAPPING DIV., United States Steel Corp., Chicago, will open a new product service section for light, heavy duty and specialty products. Responsi-

HEATING DEALERS

depend on field

FOR TROUBLE-FREE PERFORMANCE

1—MADE OF HEAVY MATERIALS — Field Controls Last Longer.

2—BALANCED AT FACTORY — Eliminating weight variations which could affect control's accuracy.

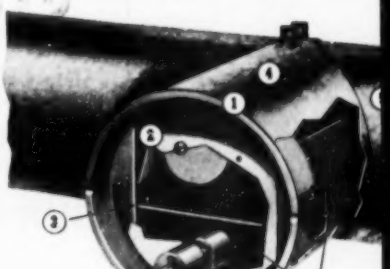
3 — ROCKER TYPE HINGE PIN — Quickly responsive, no friction. No sticking.

4—LONG COLLAR — No warping or clogging due to heat or soot, no service calls.

5—FREE SMOKE PASSAGE — A Field Control never blocks the flue.

6—SIDE WINGS AND FITTED GATE — More accurate because opening in control increases more uniformly.

7—FACTORY ADJUSTED — Set to maintain .06" draft until instrument setting is made.



The Field Draft Control is quick, easy and simple to install. But far more important it keeps performing without requiring attention itself — no warping, sticking, clogging — and without causing extra service calls due to smoking or fuel waste. And for the customer a Field Control means maximum fuel economy. For every 1/100" of excess draft eliminated, due to Field's greater accuracy, there is up to a 1% fuel savings. Yes, you can depend on Field.

FIELD CONTROL DIVISION

of H. D. Conkey & Company — Mendota, Illinois

AFFILIATES: Conco Building Products, Inc. — Brick, Tile, Stone
Conco Materials Handling Division — Cranes, Hoists

Field Controls are factory set to maintain an .06" draft until a precise, hair-line setting — possible with a Field — can be conveniently made.

If you are using or contemplating the use of heat-resisting steels for combustion chambers for oil burner furnaces, we are specialists in producing these types of steels.

Whether you are a large or small user of these steels, our steel making facilities can offer exceptional service by especially shearing to your specified combustion chamber steel blanks, or multiples thereof.

1 More quiet burner operation
2 Cleaner heat
3 Better temperature control
4 Considerable savings on fuel costs

Write us for additional information

ENGINEERING B-W PRODUCTION

Ingersoll STEEL DIVISION
BORG-WARNER CORPORATION
310 South Michigan Avenue, Chicago 4, Illinois
Plant: New Castle, Indiana

we hear that . . .

bility in this new section, headed by Harry Reed, central district sales manager, will be divided between two men who have been appointed assistant managers. They are Martin M. Groark, in charge of light duty and specialty products; and Richard G. Patterson, in charge of heavy duty products.

ARMCO STEEL CORP. plans to add new processing facilities estimated to cost about $12,000,000 to its plant at Ashland, Ky. The new program calls for a cold reduction mill, a continuous cold strip pickler, and both light and heavy gage Zincgrip lines. Construction work will begin as soon as engineering plans are complete, and it is expected that the new facilities will go into operation sometime in 1954.

THE NATIONAL Heating Wholesalers Association has moved to 27 E. Monroe St., Chicago.

THE AMERICAN RADIATOR & Standard Sanitary Corp. has plans under way for the construction of an addition to the research facilities at the Louisville research center. The new building will contain 45,000 sq ft of floor space and will be used for expanded research in the development and testing of manufacturing procedures and techniques.

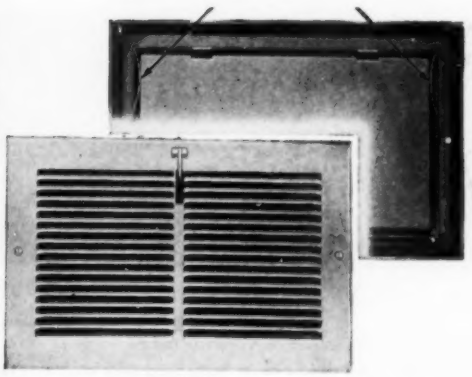
SERVEL, INC. plans a series of national advertisements describing its 3 ton gas or oil fired year 'round residential air conditioning unit. The retail price of the unit — separate from installation costs — will be announced.

A NEW PROGRAM has been developed to provide General Electric Co. customers with prompt service on inoperative electric motors. Called the small motor service station plan, the program is expected to improve previous exchange plans by providing a more complete network of repair stations for fractional horsepower and small integral horsepower motors. Under the plan, an authorized G-E small motor service station will provide in- and out-of-warranty service on G-E motors, generators, and motor-generator sets of 1/20 to 15 hp and ¼ to 10 kw. The service will include general repairing, furnishing renewal parts and exchanging motors for those that are inoperative.

IN PREPARATION for the 1953 sales campaign, 23 key field and factory personnel of Chrysler Airtemp Div., Chrysler Corp., have completed a comprehensive merchandizing and sales course in Dayton. Special emphasis was placed on the development of the residential air conditioning market. J. S. Kehoe and E. A. Nash, instructors of the Chrysler Conference of Business Management, conducted the sessions.

TAKE OUR CUSTOMERS' *GOOD ADVICE*

REAR VIEW SHOWING
DOUBLE SPRING ACTION—
PROVIDES SMOOTH OPERATION
& AUTOMATIC TENSION TAKEUP



No. A-32

COMPLETE FRAME AND GASKET ON ALL WALL REGISTERS

Start Using

A&A REGISTERS

And SAVE!

SEND FOR CATALOG

THE A & A REGISTER COMPANY
8327 CLINTON RD. CLEVELAND 9, OHIO

PORTABLE TEMPERATURE RECORDER . . .

Indispensable for SALES, INSTALLATION and SERVICE

"Very useful for selling installation jobs."

"Very satisfactory for recording outdoor temperature for 'degree day' operations."

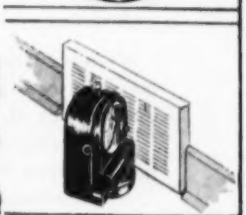
"Makes it easy to check proper thermostat location."

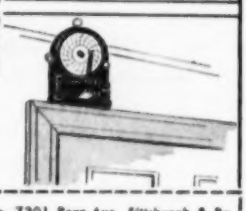
"Used all the time for balancing heating systems."

"Gives me proof of a good installation."

"Has been invaluable as proof in settling heating complaints."

"Helped me discover incorrect 'night set-back' of clock thermostat in seconds instead of hours."





The TEMPSCRIBE Temperature Recorder gives continuous time-temperature records of room temperature or of air temperature at any specific point, such as at the thermostat, at floor and ceiling levels, and above the radiators or in front of warm air registers. The temperature graph, as recorded on a 4" chart, shows at a glance the highest and lowest temperature during the test period, duration of any temperature extreme, and frequency and spread of temperature fluctuations. The instrument is compact, self-contained; no electrical connection; requires no watching. Can be stood anywhere or hung on wall. Available in ranges to cover —30° F. to +160° F. temperatures. Choice of spring wound chart drives: 8 hour, 24 hour, or 7 day rotation.

BACHARACH INDUSTRIAL INSTRUMENT CO.
7301 Penn Avenue • Pittsburgh 8, Pa.

Ask your jobber about TEMPSCRIBE Recorders, or mail coupon for Bulletin 720

Bacharach Industrial Instrument Co., 7301 Penn Ave., Pittsburgh 8, Pa.

Send Bulletin 720 on TEMPSCRIBE Recorders to:

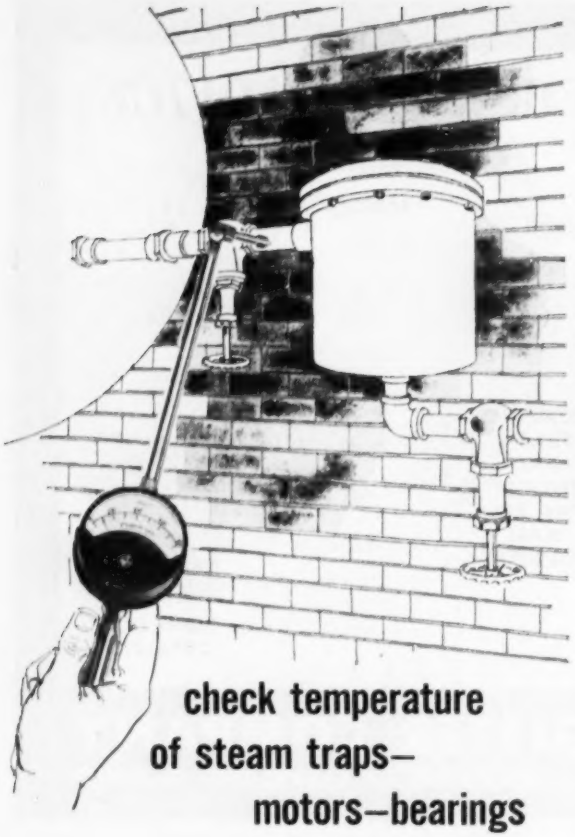
Name _____

Company _____

Street _____

City and State _____

We are: ☐ DEALER ☐ JOBBER ☐ MANUFACTURER



check temperature of steam traps— motors—bearings

. . . quickly and accurately with the Alnor Pyrocon, the portable contact pyrometer for taking surface temperatures. This handy, portable instrument can be your most useful maintenance and installation tool . . it provides accurate temperature readings instantly of any surface (metallic or non-metallic), flat, curved, stationary or revolving.

It's a well-balanced instrument mounted in a sturdy case for protection against the usual hazards of on-the-job service. Jeweled movement is also heavy-duty, shock-resistant type that will withstand hard and continuous use. . . . performing with laboratory accuracy.

A wide selection of thermocouples and extension arms assures its adaptation to your needs. Eight standard F. scale ranges are available up to 1200°F. Send for complete details contained in Bulletin 4257. Illinois Testing Laboratories, Inc., Rm. 538, 420 N. LaSalle St., Chicago 10, Ill.

Alnor

PRECISION INSTRUMENTS FOR EVERY INDUSTRY

appointments . . .

FORD A. NICKLAS as Janitrol sales representative in the Cleveland territory for the Surface Combustion Corp. Previously Mr. Nicklas was a salesman with the Bryant Heater Div. and the Iron Fireman Mfg. Co. Wallace M. Oakes has been appointed Janitrol sales representative

F. A. Nicklas

W. M. Oakes

in the Albuquerque, N. M.-Pueblo, Colo., area. He will work with jobbers in this area but will contact consulting engineers and architects direct on military and other governmental installations, schools and commercial buildings.

J. D. WILLIAMS as field supervisor in charge of all service to distributors, dealers and manufacturers for the Barber Gas Burner Co. Mr. Williams will make scheduled trips in every territory.

J. D. WILLIAMS will cover the territories in this station wagon, which is completely fitted with servicing tools and equipment

R. M. MARBERRY as national sales manager, Timken Silent Automatic Div., Timken-Detroit Axle Co. Mr. Marberry has been merchandising manager of the division since 1951. He joined the company in 1934 as editor of the house magazine.

FRANK W. CUNNINGHAM as manager of sales for the Potts-Farrington Co.

GLENN E. SEIDEL as vice president of Minneapolis-Honeywell Regulator Co., in charge of engineering in the company's Minneapolis plants. Mr. Seidel has been a member of the company's engineering organization since 1943, for the past year serving as director of the

Don't take ANY brand of SOLDER

Here are the reasons WHY!

There is a theory that a man who specializes in mousetraps will build better mousetraps than the one who makes merely wood or metal products. This is the narrow view of the self-conscious specialist.

Others say, "Specialists are those who know more and more about less and less," which invites the conclusion that the greatest specialist of all must be he who knows everything about nothing.

Federated believes that the hundreds of products of non-ferrous origin have a basic family resemblance, and that the more we know about all, the more we know about each. Thus lead is found with silver and antimony, and copper and tin are found with iron. These various elements and others must be separated and refined, or in some cases, discarded. Then, re-combined in different ways, sometimes alone, sometimes with other non-ferrous ingredients, they make brass, bronze and aluminum ingot; solders and type metals; die casting alloys, lead products and bearing metals; anodes for plating and for cathodic protection.

Federated's competent organization of scientists and technicians, its widespread field force of servicemen, and its network of qualified distributors are unified under the central policy of producing quality products and making these products most useful to every customer from the smallest to the largest.

We count it an advantage to you, and to the jobber from whom you buy, that Federated's organization is big enough to specialize in quality control and service from the depths of the mine to the user's shop. It is one of the reasons that Federated is known as "Headquarters for Non-ferrous Metals."

Federated Metals Division

AMERICAN SMELTING AND REFINING COMPANY
120 BROADWAY, NEW YORK 5, N. Y.
In Canada: Federated Metals Canada, Ltd., Toronto, Montreal

Federated first in the non-ferrous field — AMD

Aluminum and Magnesium • Babbitts • Brasses and Bronzes • Anodes
Die Casting Metals • Lead and Lead Products • Solders • Type Metals

New Addition to the Famous WISS Line of Metal-Master Snips!

No. M-5 Combination Bulldog-Type

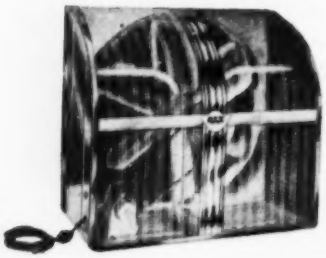
The new M-5 compound action Heavy Duty Bulldog Snips are designed for notching, nibbling and cutting shallow arcs in sheet metal as heavy as 16 gauge. This handy tool, with its sturdy jaws and powerful compound leverage, easily does the tougher notching work usually done by the heavier, longer-handled snips. M-5 Snips are made from hot drop forged molybdenum alloy steel and fitted with nickel chrome molybdenum bolts for longer wear. Only about 9" long, with a 7/8" cut, they are practically indispensable to workers in the sheet metal, air-conditioning, aviation and roofing industries. $4.25.* Order now!

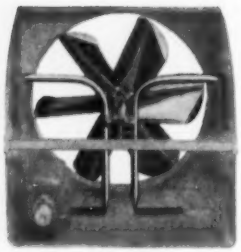
ALSO AVAILABLE—Wiss Metal-Master compound action Snips for cutting scrolls, circles or the most intricate designs in sheet metal and for straight cutting.
M-1 Cuts left, $4.25* M-2 Cuts right, $4.25*
M-3 Cuts straight and combination, $4.25*
**Prices slightly higher Denver and West.*

Quality for more than a Century

J. WISS & SONS CO., NEWARK 7, NEW JERSEY

Choose REX AIRATE Fans for Your Year Around Plans





Here's the HEADLINER with the Big H

The Rex Airate HEADLINER is a big fan for big jobs—with six deep pitched blades mounted on a big H frame—for powerful performance, quiet operation and long, long life.

The Rex Airate HEADLINER is reversible and the big exclusive H frame takes all the shiver and shake, the quiver and quake out of its operation.

The 24″ Rex Airate HEADLINER will move 3854 CFM of free air—the 28″ unit 5870 CFM—enough capacity to cool homes, stores, display rooms, motels or small plants.

Here's the "Show 'Em and Sell 'Em" Story

MOTOR—Oversize split phase motor, rubber mounted. Also available for 2-speed operation.

SWITCH—On-off switch in line. Reversing switch on cabinet.

HOUSING—Heavy gauge steel cabinet, rubber mounted.

GRILLE—Close woven decorative mesh protects rear grille.

BLADES—Six deep pitched blades reduce hum.

LUBRICATION—North, once a year. South, four times a year.

FINISH—Grille, gleaming white baked enamel; cabinet, light green Hammerloid enamel.

AIR CONTROLS, INC.
Division of the Cleveland Heater Co.
2310 SUPERIOR AVENUE • CLEVELAND, OHIO

IT'S UP TO YOU...

to boost your business and your profits in METAL ROOFING AND WEATHERSEALING and you can do it with FOLLANSBEE SEAMLESS TERNE METAL

There are big profits to be made in *metal roofing*—profits for you. But *metal roofing has to be sold!* It's up to you to do the selling in your community—to home owners, to builders, to architects. Follansbee is doing its share to help you nationally with:

1. Hard-hitting monthly advertisements to builders, architects, engineers and contractors, explaining the advantages of America's favorite metal seamless roll roofing and weathersealing material.
2. Specification and installation bulletins on Terne Metal, mailed every month to influential persons in the building market.
3. *Terne Topics*, the quarterly news round-up of developments in the rapidly-growing metal roofing field.
4. Exhibits and displays on Terne Metal, like the recent Builders' Show in Chicago—at work wherever builder, architect, or sheet metal conventions are held.

Get on the Terne Metal bandwagon. Get out after those roofing and weathersealing jobs *now*, with Follansbee Terne Metal!

FOLLANSBEE STEEL CORPORATION

GENERAL OFFICES, PITTSBURGH 30, PA.

POLISHED BLUE SHEETS AND COILS **SEAMLESS TERNE ROLL ROOFING** **COLD ROLLED STRIP**

SALES OFFICES—New York, Philadelphia, Rochester, Cleveland, Detroit, Milwaukee. **SALES AGENTS**—Chicago, Indianapolis, Kansas City, Nashville, Los Angeles, San Francisco, Seattle; Toronto and Montreal, Canada. **MILLS**—Follansbee, W. Va.

FOLLANSBEE METAL WAREHOUSES

Pittsburgh, Pa. **Rochester, N.Y.** **Fairfield, Conn.**

ordnance division. He will have complete responsibilty over research activities and all engineering work carried on in the Minneapolis plants, with the exception of work involving aero products.

G. E. Seidel

W. A. Matheson, Jr.

WILLIAM A. MATHESON, JR., to a management position in the heating division of The Heil Co. His responsibilities include expanding the distributor program of the company's heating equipment and co-ordinating promotional matters of this division and the district offices.

J. D. YOUNG as field sales manager and W. F. Rye as sales service manager of the Tuthill Pump Co. Mr. Young has been with the company for the past 24 years

J. D. Young

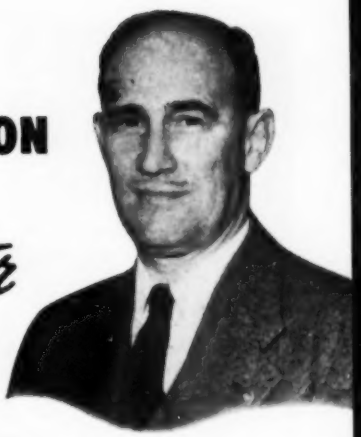
W. F. Rye

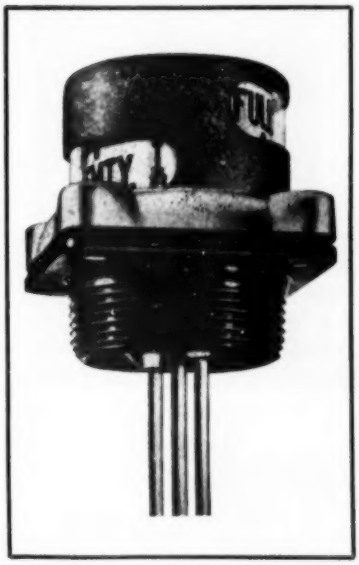
and was formerly sales service manager. Mr. Rye, formerly assistant to Mr. Young, joined the company in 1930.

RAY G. HARMS as representative for Heating Supply and Service Co., Peoria. Mr. Harms has been associated with the heating and sheet metal industry for more than 30 years, starting as a tin shop helper and apprentice in 1919, and working as contractor, salesman and installer.

RALPH L. HARDING, JR., as market research analyst for Allegheny Ludlum Steel Corp. Mr. Harding was formerly a staff consultant for Methods Engineering Council, management consultants. Edmund C. Tynan has joined the company's stainless tubing sales division. Previously

"WE'RE SOLD ON *Rochester* GAUGES!"





"Rochester 'Dual-Dial' Oil Gauges have been our 'stand-by' for years. After long periods of use we find our records show no service charges for gauges. This means better customer relationships and economical operation."

Earl L. Kunkle

EARL L. KUNKLE
R. L. Stott Company
Oil Burner Sales
and Service
Philadelphia, Pa.

The R. L. Stott Co. has been serving three heavily populated Pennsylvania counties for over 25 years. Experience has sold them on the complete dependability and positive leak-proof feature of Rochester "Dual-Dial" Oil Tank Gauges. They know these gauges can't leak oil or vent fumes, even under pressure. As a result customers are satisfied. Costly service calls are eliminated. What's more the large, magnetically actuated "Dual-Dial" is easy to read from both front and back—indicates the oil level at a glance.

Ruggedly built, easy to install Rochester Gauges have been Underwriters' listed for over 25 years. Stocked by leading wholesalers for basement oil burner storage tanks in the following depths—22", 24", 27", 42", 44", and 47"; 1½" and 2" pipe thread connections. Special lengths to order . . . STOCK UP NOW. Rochester Manufacturing Co., Inc., 66 Rockwood Street, Rochester 10, New York.

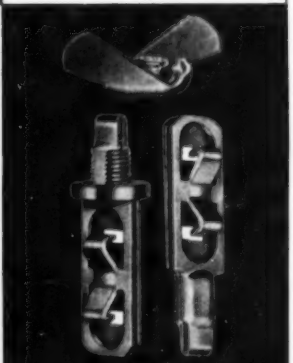
ROCHESTER MANUFACTURING COMPANY, INC.
DIAL THERMOMETERS GAUGES AMMETERS

ROCHESTER DEPENDABLE ACCURACY GAUGES

E-Z-ONS
CLINCHING ACTION
for Positive, Quick and Easy Installation

- E-Z-ONS two claw-like prongs clinch and grip from opposite directions to assure a tight fit.
- One blow permanently rivets — not 3 or 4 operations.
- E-Z-ONS will not swivel or loosen.
- E-Z-ONS eliminate sheet metal screws, rivets or washers — *none to use — none to lose.*

Leading Jobbers Stock E-Z-ON.



STANDARD
E-Z-ON
DAMPER REGULATOR

M. A. GERETT CORP.
722 WEST WINNEBAGO STREET, MILWAUKEE 5, WISCONSIN

BEVERLY THROATLESS SHEARS

MAKE CUTS LIKE THESE

QUICKLY... EASILY... ACCURATELY

18 ga. metal cut with Model B-1 Shear.

Save time, labor and material use a Beverly to make any cut . . . straight, curved or irregular in any metal. Exclusive design allows work to be turned at any angle while cutting. Standard in the industry for years. 4 models — capacities to ¼" mild.

See your Beverly Distributor for a demonstration. Write for FREE illustrated circular on Beverly metal cutting Shears.

MODEL B-3 with ball bearing hold down. Cap. ¾" mild; 10 gauge stainless.

Beverly SHEAR MFG. CO.
3020 W. 111th STREET • CHICAGO 43, ILLINOIS

appointments . . .

he was a sales representative handling stainless pipe, tubing and fittings for John B. Asteel & Co., New York. James W. Murphy has been appointed manager of sales of the company's Stainless and Alloy Castings Div. at Buffalo. Mr. Murphy has been with the company since 1936, and has served as assistant sales manager of the Castings Div. for the past few months.

W. C. WALTER as general sales manager of Norge Heat Div., Borg-Warner Corp. Mr. Walter has been with the company for more than six years. He formerly was western regional manager covering the Mountain States as well as the West Coast, with headquarters in Los Angeles.

W. C. Walter

R. C. Champlin

ROBERT C. CHAMPLIN as chief engineer of the Skuttle Mfg. Co. Previously, Mr. Champlin was vice president and general manager of the J. L. Gillen Co.

JOHN A. MCCARTHY as sales manager of the Made-Rite Co., Inc., succeeding Frank A. Stall.

WILLIAM V. RYAN as general sales manager of the South Wind Div., Stewart-Warner Corp. Mr. Ryan has been with the company for the past 10 years, during which time he has participated in sales and service of aircraft and military heating equipment. During the past four years he has been in charge of aircraft heater sales.

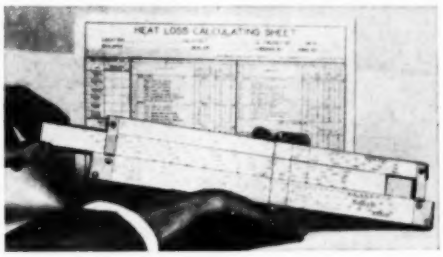
THOMAS L. CARVER, formerly of the United Motors Service Div., General Motors Corp., as sales representative of the Fiber Glass Div., Libbey-Owens-Ford Glass Co., in New York.

D. J. GOTT as manager of the western regional office in Los Angeles for the Detroit Controls Corp. Mr. Gott's previous post as representative in the San Francisco area will be filled by E. C. Ward, formerly of the Detroit sales office.

J. F. KNOFF as vice president and general sales manager of the Chrysler Airtemp Div., Chrysler Corp. Mr. Knoff joined the company in 1945 as a district representative

HEAT LOSS CALCULATOR

Accurate, inexpensive heat loss estimates are readily obtainable with the new "Climatemaker" heat loss calculator announced by its manufacturer, and designed for use of dealers in residential heating equipment. The Climatemaker eliminates the drudgery, guessing and expense of heat loss calculating with complicated reference books and charts. It saves 11 steps in figuring heat loss. It



estimates btu loss for each room, plus total loss from house; CFM requirements for forced warm air, gravity 200° and gravity 175° heating units; square feet of steam or hot water radiation required; pipe area and other details for systems and for each floor; line loss; coal, oil or gas furnace sizes and other details. Send $15 cash, check or money order or write for full details to Climatemaker Heat Loss Calculator Co., Dept. 112, Box 378, Bloomington, Ill.

Made in 28, 26, and 24 gauge steel hot dipped galvanized after formation.

Sizes from 1" to 6". Angles from 10 degrees to 90 degrees.

Also in Copper, Aluminum and Stainless Steel.

Catalog available from your jobber.

THE FERDINAND DIECKMANN CO.

ESTABLISHED 1871

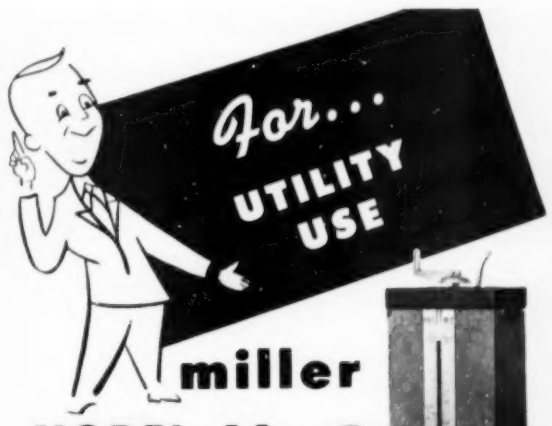
P.O. STATION B **CINCINNATI 22, OHIO**

A positive seal

for **OIL • GAS**
FREON • BUTANE
STEAM • WATER

Pipetite provides a positive seal for joints regardless of the type of fluid or gas being used. It is the dependable joint compound that makes good workmanship and assures user satisfaction. To be absolutely sure of "no leaks" use Pipetite. If your supplier does not have it . . . write direct.

LAKE CHEMICAL CO.
LACO BRAND
3050 W. W. Carroll, Chicago 12, Ill.



MODEL 44
A.C. ARC WELDER

- Continuous current adjustment
- Two welding current ranges
- Glass insulated copper magnet wire
- Space layer wound primary and secondary coils
- Substantial steel case and frame
- Maximum portability
- Reconnectable for 115/230 volt power supply

This welder combines all the outstanding construction principles of the larger MILLER Industrial Type Welders plus extreme utility and offers the user maximum arc flexibility through the features listed above. Write today for complete details and name of the nearest MILLER distributor.

miller ELECTRIC MANUFACTURING CO.
SINCE 1929 APPLETON WISCONSIN

appointments . . .

in the New Orleans region. E. A. Nash has been named merchandising manager of the Airtemp Div., after serving seven years as district and regional sales manager and sales training manager of the Chrysler Airtemp Sales Corp. J. G. Kehoe will replace Mr. Nash as sales training manager.

J. F. Knoff

E. A. Nash

Weiss and Besserman, Inc., New York appliance wholesaler, has been appointed distributor for the company's room air conditioners and dehumidifiers. The distributor maintains offices and showrooms in New York City and Newark.

SAMUEL A. WEISS, president of Weiss and Besserman, signs the contract to distribute room air conditioners and dehumidifiers in the New York, New Jersey and lower Connecticut areas

SPENCER WOLF as territory manager for Cory Corp., handling sales of home appliances in Wisconsin, upper Michigan and eastern Iowa. He will have headquarters in Milwaukee.

CARL F. ZAUNER as national service manager, Charles Cross, service parts manager and H. D. Kline, field representative for the Air Conditioning Div., Remington Corp.

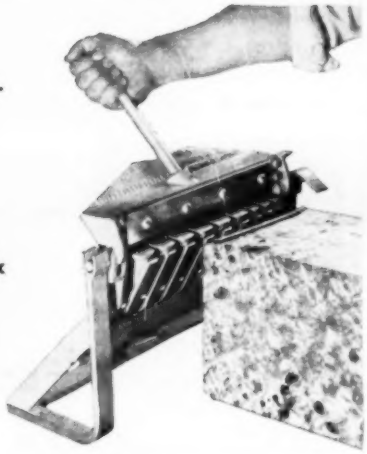
W. R. LOCKWOOD as manager of the Seattle steel service plant of Joseph T. Ryerson & Son, Inc., succeeding C. W. Summerville, who will remain with the company

FLANGES THE DUCT

IN LESS THAN 5 SECONDS.

Makes your drive-cleating work so much easier and faster.

Works like a bar-folder with a new twist . . . Handling the work back and forth has been eliminated by a unique manipulation of the bender itself.



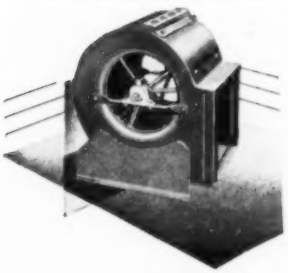
These benders are calculated to fit any size duct up to width of bender and any gauge up to 20 Mild Steel, *without adjustments.*

No. 12 SMITH'S CLEAT BENDER (12" wide) $42.00*
No. 18 SMITH'S CLEAT BENDER (18" wide) $66.00*

*Prices FOB Waukegan, Ill.

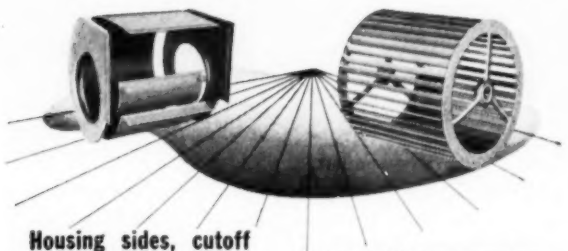
Write for dealers name

R. E. SMITH
1806 BELVIDERE ST.
WAUKEGAN, ILLINOIS



MASSACHUSETTS AIR CONDITIONING FURNACE BLOWERS

Designed for manufacturers of warm air furnaces and air conditioning equipment. Wheel Sizes 7½" to 27"



Housing sides, cutoff plate and scroll sheet. Heavy gauge steel stampings.

End spider suspension type wheel assembly.

Write for catalog

Manufacturers of centrifugal blowers for 36 years

MASSACHUSETTS BLOWER DIVISION
The BISHOP & BABCOCK Mfg. Co.
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NO *CUTTING JUGGLING FRANTIC FITTING*

. . . . not with

YOUNGSTOWN FITTINGS

THEY FIT THE *FIRST* TIME!

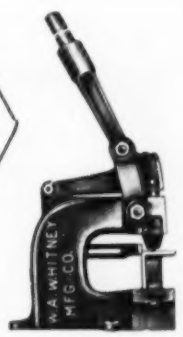
The "NO's" have it in this case! And you'll easily see for yourself the reasons why when you try your first order of Youngstown Furnace fittings. They're conscientiously made to very exacting standards to make certain they'll FIT the first time. You can schedule jobs and estimate costs with full assurance that there will be NO delay due to installation troubles caused by poorly designed fittings. Youngstowns enable your men to work faster and you to make more money.

Write us now for more detailed information.

YOUNGSTOWN FURNACE CO.

627 Marshall Street · Youngstown, Ohio

NO. 91 BENCH PUNCH



Punches

Angle Iron	Channel Iron
2½ x 2½ x ¼	2½ inch Flange x ¼ inch Web

Capacity

½ inch hole through ¼ inch iron
¾ inch hole through 3/16 inch iron
2 inch hole through ⅛ inch iron

Here's a quality item accepted by workmen as a real time-saver in the shop and on the job. Men who use the No. 91 bench punch every day know it's the best obtainable: clean, fast punching in any type of work. Illustration shows narrow bolster plate which is used with angle iron and channel iron and holes up to and including ⅝ inch round.

Please write us today for booklet.

W.A. WHITNEY MFG. CO.
636 RACE ST. ROCKFORD ILL

CHICAGO

Steel
BENDING BRAKES
One-man operation

CHICAGO hand-operated bending brakes are available in a variety of standard sizes ranging from 3 to 12 feet in capacities up to 12-gauge sheet metal.

also

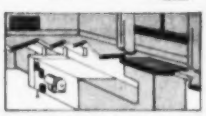
CHICAGO Portable Hand Brakes
CHICAGO Box and Pan Brakes

Full Particulars upon Request

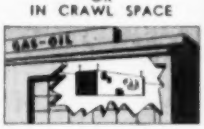
DREIS & KRUMP MANUFACTURING COMPANY
7404 S. Loomis Blvd., Chicago 36, Illinois

85,000 BTU — OIL-FIRED

BARD MULTI RADIATOR
WARM AIR HEATING



CEILING SUSPENDED
OR
IN CRAWL SPACE



Multi-Radiator means more heating surface—greater efficiency. Top-quality burner. Completely wired controls.

UNDERPRICED BECAUSE . . .

Volume production on modern assembly line. Unit inspection for quality control. The greatest value in horizontal furnaces.

. . . Call, Wire, or Write for Price data.

BARD MFG. CO., BRYAN, OHIO

appointments . . .

in the capacity of plant manager and advisory consultant to management. Mr. Lockwood has been with the company for 26 years, serving as sales representative at the St. Louis plant, manager of railroad sales at Chicago and assistant manager at Seattle for the past year.

W. R. Lockwood

F. H. Callahan

Rear Admiral Fort H. Callahan, U.S.N. (ret.) as special representative in Florida for Sid Harvey, Inc. He will call on oil burner and gas companies in reference to replacement parts service.

Joseph M. Norton as factory representative for Incineration Div., Bowser, Inc., in the northeastern area. Mr. Norton will call on public utilities, distributors and dealers handling automatic gas fired incinerators in New York, New England, New Jersey and Washington, D. C.

Calvin D. Beck as manager of the Dayton district sales office of Armco Steel Corp. Mr. Beck has been with the company for 23 years, beginning as a sales trainee in 1930.

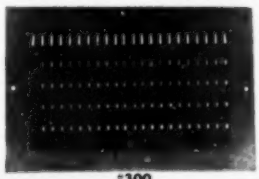
Clifford d'A. Hanner, 239 E. 73rd St., New York, as special factory representative in the New York metropolitan area for Dryomatic Corp. Joseph S. Kern, Jr. & Associates, 421 7th Ave., New York, has been appointed distributor for New York City, Westchester County, and New Jersey. Sales to industrial firms located in Brooklyn and Queens will be handled by Eastern Air Conditioning Co., Long Island City. Distributors on Long Island will be H. Klein & Sons, Mineola, N.Y.

The Interstate Industrial Equipment Co., 2605 Warwick Trafficway, Kansas City, Mo., as sales representatives for the Multi-Vent low velocity air diffusion panels of Pyle-National Co. Territory will consist of the western half of Missouri and all of the State of Kansas.

Aluminum Distributors, Inc., 618 W. Pershing Road, Chicago, as a distributor of aluminum mill products for Reynolds Metals Co.

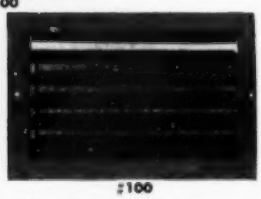
Herb Koether as manufacturer's representative for the Viking Air Conditioning Corp. Mr. Koether was formerly midwest divisional sales manager for the Apex Electric Mfg. Co., has also served as sales manager with

See Your Jobber



#300

#200



#100

Many thousands of the above types used in housing projects. Lowest in price, more free area.

The Air-O-Vane ceiling diffuser. Also made in type D-R with positive shut-off control (Patents Pending) made in all sizes.

Greatest in free area of any ceiling diffuser and lowest in cost. Write for catalogue or see your jobber.

AIR-O-VANE CEILING DIFFUSER
WRITE FOR CATALOGUE TO —

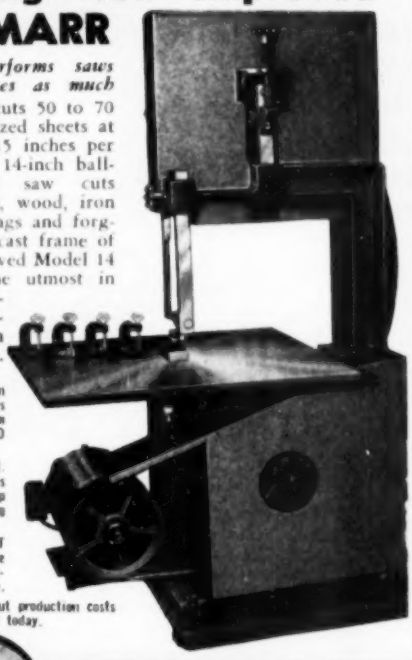
KRUEGER
AIR CONDITIONING COMPANY

19 EAST RILLITO ST. TUCSON, ARIZONA

Amazing New Improved BETT-MARR

actually outperforms saws costing 6 times as much

BETT-MARR cuts 50 to 70 stacked galvanized sheets at speeds up to 15 inches per minute. This 14-inch ball-bearing band saw cuts metals, plastics, wood, iron and steel castings and forgings. The all-cast frame of the new, improved Model 14 MS assures the utmost in stability and accuracy and reduces vibration to a minimum.



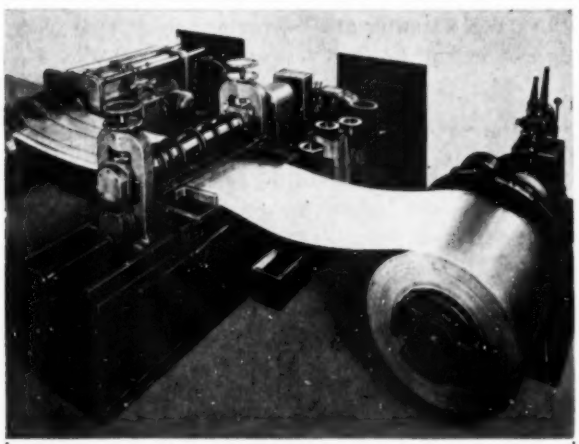
Smooth, powerful chain drive with blade speeds quickly adaptable from 125 FPM to 2200 FPM.

Positive blade control. Case hardened guides with carbide back-up bearing assure cutting accuracy.

PRECISION BUILT — yet it costs little more than a home-workshop power saw.

Learn how you can cut production costs —write BETT-MARR today.

BETT-MARR MFG. CO. HOPKINS, MINNESOTA



". . . we're looking for slitting business, too!

Complete equipment for precision slitting and recoiling; also decoiling, roller leveling and cutting to lengths. METALS — 14 gauge or lighter — any width up to 36".

Write us for details . . . prompt attention is guaranteed.

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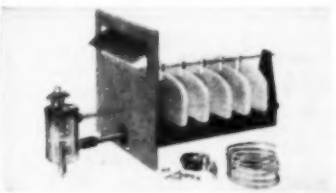
Manufacturers & Suppliers
Furnaces — Pipe and Fittings

10th and Monroe St. Newport, Ky.



For EXTRA SALES

in the OFF-SEASON MONTHS

Foresighted buyers install new heating equipment and make repairs during the off-heating months. But it's during the heating season that these same buyers notice the effects of dryness, and recognize the need for re-humidifying the air.

NOW — while these effects are apparent — is the time to sell Monmouth Humidifiers — to keep your crew profitably employed installing them. They are easy to sell to home owners who value their furniture and have concern for their children's health. One or both of these arguments will enable you and your men on service calls to make many extra sales.

Monmouth comes packaged complete — in 16 sizes up to 420,000 B.T.U. All employ the Monite fast vapor diffusion plate, and time-tested Flotrol or Microfeed control.

Monmouth can make money for you in the off season. Write for complete descriptive literature.

THE CLEVELAND HUMIDIFIER CO.
7802 Wade Park Avenue Cleveland 3, Ohio

MONMOUTH HUMIDIFIERS

TO RAPIDLY
EXHAUST
HEAT
SMOKE
FUMES
DUST

THE BURT F.E.F. VENTILATOR
IS EXTREMELY EFFICIENT

If your problem is rapid spot removal of contaminated air, investigate Burt's new F.E.F. (Free Exhaust Fan) Ventilator. Two Dampers open wide automatically in operation — close automatically for thorough weatherproofing when motor is shut down. The airshaft functions as an absolute free opening. Seven sizes and seventeen motor choices provide capacities from 5,000 C.F.M. to 75,500 C.F.M. For complete data see Sweet's, or write for Bulletin S.P.V.-18

FAN & GRAVITY VENTILATORS • LOUVERS • SHEET METAL SPECIALTIES

The Burt Manufacturing Company
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Big Time and Money Savers for YOU!
LOCKFORMERS

- Cut Over-All Fabrication Costs in Half.
- Make Pittsburghs 15 Times as Fast as you Can Make them on a Hand Bending Brake.
- Pay for Themselves Quickly Out of the *Extra Profits* each one Earns.

ALL MODELS IN STOCK FOR IMMEDIATE DELIVERY!

Easy edgers and power flangers also available for immediate shipment.

- Send for illustrated folder and more information about this and other sheet metal working equipment.

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Look Better — Last Longer

Superior workmanship and finish in heavy-gauge metal assures installations of lasting beauty. Most designs stamped in any thickness, up to one-fourth inch, from any metal. Catalog No. 36 illustrates all designs and gives complete working data. Free on request.

Diamond Manufacturing Co.
Box 34 Wyoming, Pa.
Sales representatives in all principal cities

appointments . . .

the Crosley Div., Avco Mfg. Corp. In addition, Robert M. Wolaver has been appointed to the company's engineering staff. He will handle industrial design and exterior styling of air conditioning products.

R. M. Wolaver

J. H. Dowling

J. H. DOWLING as assistant vice president in charge of marketing of Follansbee Steel Corp. Mr. Dowling, formerly general manager of the firm's division, Follansbee Metal Warehouses, will direct market research for the company's three divisions.

JACK W. WATSON, JR., as assistant to the vice president and general manager of Kaiser Aluminum & Chemical Corp. Mr. Watson was previously West Coast manager of aluminum sales. He joined the company in 1946.

DONALD S. HARWORTH as southern division sales manager of the Farr Co., with headquarters at Nashville.

D. PAUL BAILEY as assistant sales manager of the Iron Fireman Mfg. Co. Mr. Bailey has been director of market research since he joined the company in 1949. His new duties will include the continued supervision of market research.

EARL FUSON, assistant manager of the Dallas office, Metalbestos Div., William Wallace Co., will assume the administrative duties of that office under C. E. Blome, manager. Mr. Blome, in addition to his work in conjunction with Mr. Fuson, will be in charge of the national training and promotion program for the company.

GUY T. GUNTER, JR., as sales representative for Delta Heating Corp. He will cover Alabama and Georgia from his office at 905 Woodland Ave., S. E., Atlanta.

Jackson G. Gilmore

JACKSON G. GILMORE, 62, of Jackson G. Gilmore & Co., Columbus, O., died on December 25 in White Cross Hospital. In the oil heat industry 35 years, he maintained an oil burner equipment office at 167 E. State St. Mr. Gilmore was a pioneer in the development of oil combustion.

WALKER FUEL SAVERS

CHECK THESE 9 POINTS OF SUPERIORITY

1 EASE OF ADJUSTMENT
Turn of pointer on calibrated dial instantly selects correct draft. Calibrations correspond to specific draft values.

2 BOX TYPE PIVOT HINGES
Positive sealed bearing surfaces, friction-free nickel-plated hinge pins, protect against corrosion . . . dirt . . . dust. This most expensive construction gives long life.

3 BALANCE PLATE . . .
scientifically designed with accurate brass fittings to maintain correct balance between atmospheric and pressure inside smoke pipe.

4 SPECIFIC PIPE SIZES
Insures correct capacity for every type of installation.

5 ALUMINUM FRAME
Aluminum casting is rigid . . . light . . . long lasting.

6 EASE OF INSTALLATION
Collar or stub furnished to provide quick attachment to pipe.

7 ARMCO ALUMINIZED STEEL
. . . finest available for heat and corrosion resistance.

8 FACTORY-SET
accurate balance . . . assures performance as perfect as possible.

9 INSIDE VIEW

Shows unrestricted area for free flow of air . . . effecting more complete regulation.

NO OTHER DRAFT REGULATOR HAS ALL THESE FEATURES

New WALKER Venturi-Top Chimney Cap

Designed to the basic Venturi engineering principle. Streamlined vane and hood is mounted on a patented friction-free pivot. Always maintains position away from wind to prevent chimney down drafts. Specify this quality device in the 9 out of 10 service calls traceable to insufficient draft. Effective also for ventilating purposes. Pipe size: 8". Larger sizes available soon.

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Save money on Multi-blade DAMPERS

Make your Dampers with . . .

"DURO BLADE KIT"

PRECISION-ENGINEERED DAMPER HARDWARE

Note Parallel
OR Opposed blade action

- **Each blade quickly adjustable**
- **Tilting brackets line up automatically After Installation (can use inexperienced labor)**

for Samples & Prices . . . Write Dept. B

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CORPORATION

38 South Franklin Street, Hempstead, L. I., N. Y.

Save time and effort with expertly rolled Angle Rings that FIT Accurately on the job. Back them up together and you'll find each is a true circle with a 90° angle.

We roll rings to specification including tees, rounds, flats, channels, tubes and special shapes with or without rivet holes.

Used for many purposes such as reinforcing tanks, joining pipe or smoke stacks, and installing air conditioning fans. Write for our list of standard sizes and discounts — also our circular illustrating our fabricating services.

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NATIONAL METAL FABRICATORS

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ADJUSTABLE PIPE SNOW GUARDS

"FITRITE" 3 Pipes, ¾" I.P.S. For all types of steep roofs

"PROTECTOR" 2 Pipes, ½" I.P.S. For smaller roofs, new or old.

"FITRITE" SKYLIGHT GEARING

⅜", ½", 1" Hook or chain operation ½" Gearing assembled on 20" pipe

"FITRITE" ROOF STRAINERS

Bronze and Aluminum

BEEHIVE 3"-8" round. Also 3" x 4", 4" x 5" square

3 Types 6", 8", 10", 12" square

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A New Vice-Grip Made Exclusively For Us

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See our CATALOG in SWEET'S FILE

A-C SELLS HOMES—

(Continued from page 68)

separate condensing unit; year 'round systems which had been built up by using separate cooling and heating units or parts; and other types.

Selecting the Right Equipment

How can the builder best incorporate comfort cooling in the particular houses (in the particular locality) with which he is concerned? In discussing this question, K. T. Davis, Bryant Heater Div., Affiliated Gas Equipment, Inc., pointed out, first, that the capacity of the unit required will depend upon the size of the house, its construction, and the local climate. The fuel selected will, likewise, be a matter of local economies and local experience.

Mr. Davis recommended that, in any case, provisions be made to comfort condition the entire building during summer, not just a few rooms, since people are not usually satisfied with partial comfort, and since rooms specified to be cooled may not be kept comfortable if doors are open to unconditioned rooms.

He pointed out that the usual ductwork in typical forced warm air heating installations requires little if any modifications for switching to cooling.

Mr. Davis also discussed characteristics of the ideal discharge grille, automatic controls, and the indoor design temperatures which should be maintained by cooling equipment (no higher than 80 F and a relative humidity of 50 per cent).

Construction Can Help Reduce Cooling Load

"It is the function of the conditioner to add or remove the heat required for comfort. Whether the amount of heat to be added or removed is little or much depends largely upon the thought and care which goes into planning and construction of the house itself — in other words, the quality of the 'envelope' ". This was the view expressed to the builders by J. A. Gilbreath, Servel, Inc.

He went on to say that the objective should be to reduce the rate of heat flow to a practical minimum, both summer and winter, in order to reduce equipment and energy requirements.

Cooling loads, he said, can often be reduced by careful placement of the house on the building lot. Turning the smallest wall area toward the west reduces the exposure, and the load. A garage located on the west side of the house will also reduce cooling load.

He also mentioned that summer loads could be reduced by proper landscaping, by the use of roof overhangs as shading devices, and by double glazing of large window areas. Insulation, he said, is considered a "must" in modern housing for both good heating and good cooling practice.

...here's the
JABSCO
The outstanding pump for evaporative coolers. Here's why:

JABSCO'S ADVANTAGES:
- DRIVEN BY BLOWER SHAFT – separate pump motor and wiring eliminated
- INEXPENSIVE • EASY INSTALLATION
- NOISELESS • MAINTENANCE FREE

Capacity: 105 Gallons per Hour @ 500 RPM
180 Gallons per Hour @ 870 RPM
240 Gallons per Hour @ 1160 RPM

Write for free folder. Price includes pump, mounting brackets, hoses and screens. Liberal discounts to O.E.M. and distributor accounts.

price complete $18.25

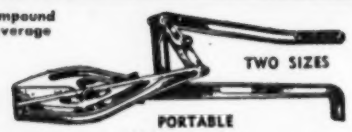
Bronze Evaporative Cooler
PUMP

EXCLUSIVE JABSCO FEATURES:
- NEOPRENE IMPELLER – Water lubricated – wiping action prevents liming
- ALL-BRONZE BODY
- STAINLESS STEEL SHAFT
- GRAPHITE BEARINGS
- MECHANICAL SHAFT SEAL

PATENTED AND PATENTS PENDING

JABSCO PUMP CO.
2011 N. Lincoln Street, Burbank, Calif.

BREMIL
The IMPROVED Compound Lever Shears



ALL-ALLOY No. 2 cuts up to ¼" steel plate.
ALL ALLOY No. 1 cuts up to No. 11 gauge strip or sheet

BREMIL MANUFACTURING CO.
1800 Pittsburgh Avenue ERIE, PA.

A REAL PROFIT MAKER...
Add germ control to heating and air conditioning sales.

Glycolator ---- reduces air-borne bacteria and viruses, thus reducing colds and other respiratory diseases.

FURNACE MODEL
Mounts easily on forced air stack. Low cost; thermostatically controlled. Treats up to 20,000 cu. ft. of air per hour.

THE REGAL PORTABLE
Fully automatic, lightweight, fan dispersion. Treats up to 100,000 cu. ft. of air per hour.

LARGE CAPACITY, COMMERCIAL MODELS AVAILABLE.
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MACHINERY SPECIALISTS

STOCK DELIVERY ON PEXTO, CHICAGO BRAKES, DIACRO, ROUSSELLE PRESSES, KIDDER, WHITNEY, ROTEX PUNCHES, REX WELDERS

WE CARRY A COMPLETE STOCK OF NEW & USED HAND & POWER MACHINERY.

WE STOCK PUNCHES & DIES & ADAPTERS FOR ALL PRESSES & BRAKE DIES, SHEAR BLADES & SPOT WELDER-TIPS & HAND TOOLS.

MILTON EQUIPMENT COMPANY
N.E. COR. 4th & Race St. Phila. 6, Pa.
WAlnut 2-1734

No other furnace gives you both

CIRCULATING WARM AIR HEAT
PLUS CONTROLLED DOMESTIC HOT WATER SUPPLY

Metropac JUNIOR — for smaller homes

Metropac DELUXE — for larger residences also provides circulating cool air in summer.

For details and information about available franchises, write Dept. AA9.

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REPAIR PARTS for all FURNACES
BOILERS, STOVES • *Guaranteed to* FIT

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Zinc Ornaments Available From Stock. Copper, brass, bronze, aluminum and stainless steel ornaments made up promptly.
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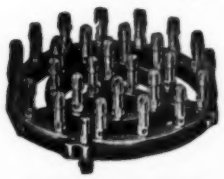
BARBER BURNERS
For All Gas Appliances



We have the facilities and experience for designing and building the exact type and size of burner unit to fit any gas appliance, using natural, manufactured, Butane or bottled gas. We cooperate with any reliable manufacturer in the necessary development and laboratory testing, and in acting as continuous source of supply for his burner units.

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Hard to SODER — Metals
Aluminum, Cast Iron
Stainless Steel
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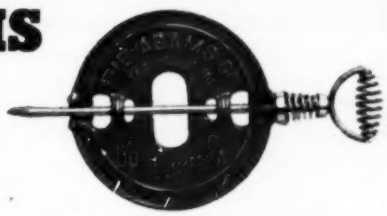
ALLEN
FLUXES
SODERING
BRAZING & WELDING
L. B. ALLEN CO., INC. Chicago 31, Ill.
6702 BRYN MAWR AVENUE, CHICAGO 31, ILL.

ADAMS

Sizes from 3 to 18 inches



Diamond Smoke Pipe Damper

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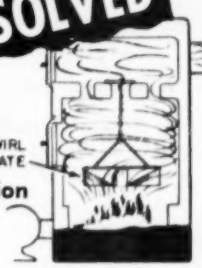
Buy Adams Known Quality
THE ADAMS COMPANY
Bridge Street • Established 1883 • Dubuque, Iowa

YOUR **BAFFLING PROBLEM** **SOLVED**



With the Only Swirling Action
BAFFLE PLATE
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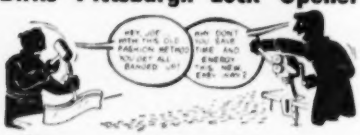
Birks Pittsburgh Lock Opener



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Curved or Straight Sections
Easy to Operate
Prevents Injury

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RUBBER LADDER SHOES
for safe climbing
$2.95 per pair
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can be done easily with handy folder on how to estimate heat loss, air requirements and equipment capacities for forced warm air winter air conditioning systems. Also tells how to design and size entire trunk systems branches, risers, stack-heads and registers and grilles. Price one dollar. Write to

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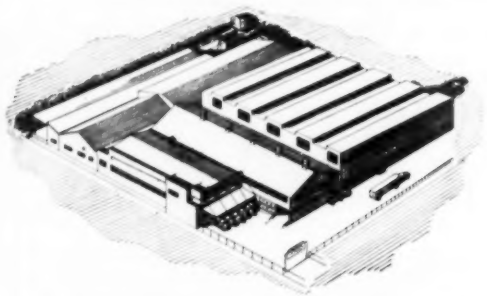
. . . the blood bank is low!

. . . the need is desperate!

What Happened to That Pint of Blood YOU Were Going to Give

the best reason for business paper advertising today . . . is *tomorrow!*



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agents wanted

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☆

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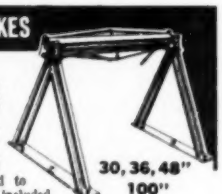

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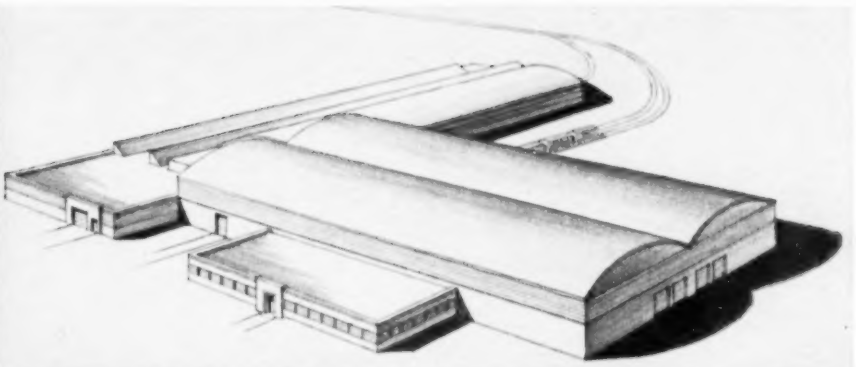

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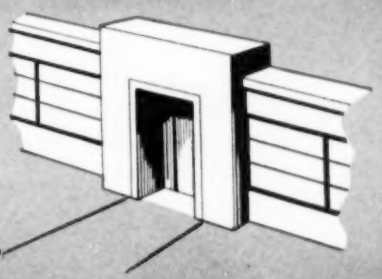

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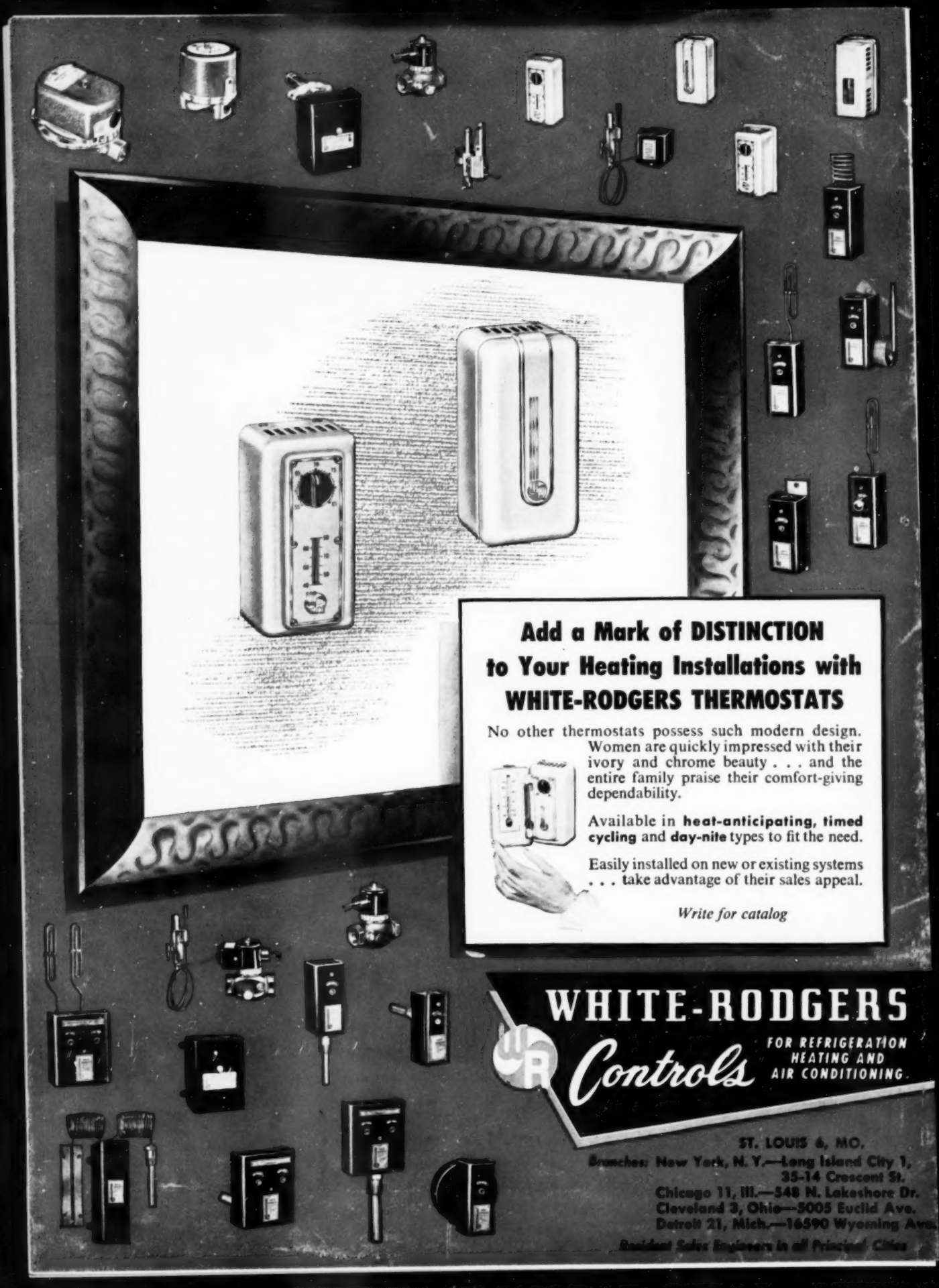
Wisconsin Office — 176 W. Wisconsin Ave., Milwaukee 3, Wis.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